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DETROIT

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Automotive Daily News

CARS · SHOP EQUIPMENT · TRUCKS · AVIATION · PARTS · ACCESSORIES · TIRES

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Stewart 3½-Ton Chassis Has 8-Cylinder Engine And 12 Forward Speeds

New Model Offered on Standard Wheel Base of 170 Inches Is Priced at $3,990

BUFFALO, N. Y., March 17.—The Stewart Motor Corporation announces today its new twelve-speed, 3½-ton chassis, with overdrive and powered by a new Lycoming engine, with eight cylinders in line. In introducing this new model, Stewart, in keeping with its modern trend in truck engineering, offers a heavy duty eight-cylinder truck which is designed for high speed with full load.

The new 8-in-line engine is of the "L" head type with a bore and stroke of 3¾ inches by 4¾ inches. The piston displacement is 410 cubic inches. The engine develops 130 h. p. The manufacturers state that greatest torque is developed at low speeds, thereby affording exceptional high gear performance.. The engine is mounted on rubber at three points. The cylinder block and crank case are cast integrally and the head is removable. Full force feed lubrication is used. Valve stems and tappets are lubricated by spray from the crankcase.

The intake manifold is the Swan type with heat control. A single type Stromberg carbureter with an air-cleaner is used. Battery type ignition with semi-automatic spark control is employed. The starter and electrical equipment are made by Delco-Remy.

The clutch is a large dry plate, multiple disc, gear tooth type, which is automatically adjustable for wear. Special pedal reduction is incorporated to provide light pedal pressure. The clutch throwout bearing is lubricated by means of an alemite fitting located outside the case.

Twelve forward speeds and three reverse speeds and overdrive are provided by means of the standard four-speed transmission attached to the engine and the axuliary transmission mounted amidship, both of

(Continued on Page 6)

1931 JOBBER CLINIC IN PHILADELPHIA EXCEEDS LAST YEAR

Philadelphia, Pa., March 19.—Philadelphia's 1931 Automotive Equipment Show and Service Maintenance Demonstration, largest of its kind ever held in this vicinity, opened auspiciously yesterday in Terminal Commerce Building, 401 North Broad St., under direction of Philadelphia Jobbers' Association. Products of 129 manufacturers are displayed, which is double the number shown last year.

Displays occupy 35,000 square feet, as against 14,000 a year ago. Newest types service equipment, tools and replacement parts are displayed and machine tools are demonstrated by factory men. The latest methods of motor reconditioning, including body and fender maintenance, brake service, complete lubrication, washing, polishing and wheel alignment are featured.

Fifteen hundred persons were in attendance during the first day, and Harvey S. Plummer, show manager, estimates the total attendance for the three-day period of the exhibition will reach 7,500.

Manual school training professors

(Continued on Page 15)

U. S. HOLDS ITS LEAD AS TIRE EXPORTER, BUT VOLUME IS OFF

Washington, March 19.—The United States maintained its position as the chief tire supplying nation during 1930, despite a general decline both in volume and value in the world exports of this commodity, according to the Commerce Department's rubber division.

Every major tire exporting nation experienced a volume decrease with the exception of the United Kingdom and Germany, the former replacing Canada as the second largest supplier.

The world decline is attributed chiefly to the effects of the economic depression with increased competition and the tariff barriers

(Continued on Page 8)

NEW AUBURN DEALERS ARE WELL FINANCED; LIST STILL GAINING

Auburn, Ind., March 19.—Eighty-one new dealers were added by Auburn in the first nine days of March, N. E. McDarby, vice-president in charge of sales, announced today.

In making the announcement, McDarby said:—

"It is indeed gratifying to note that the inquiries which are coming in for our franchise are from dealers that are long experienced in automotive sales, and who have made a success of merchandising automobiles. The majority of these inquiries are from dealers well financed and with excellent locations."

McDarby cited as the type of distributors and dealers which had

(Continued on Page 8)

CENSUS OF WORLD CAR STOCKS PLANNED

Washington, March 19.—The condition of automobile stocks throughout the world will be reported monthly to the Department of Commerce. Cable reports compiled in various countries are expected to be of vast importance to American manufacturers and exporters, it was

(Continued on page 9)

February Commercial Car Sales Put at 23,000, a Slight Decline

Estimate, Based on Registrations From Twenty-Two States and D. C., Indicates Small Drop From Preceding Month

NEW YORK, March 19.—Registrations of new commercial cars in the United States in February approximated 23,000, a slight decline from the preceding month, according to an estimate based on returns now available from twenty-two states and the District of Columbia.

This total would compare with approximately 24,100 in January, and would be about 26 per cent. below the 31,846 new trucks registered in February of last year.

Returns from the states that have reported thus far show a total of 7,785, as against 9,185 in the preceding month, and comparing with 10,419 in the corresponding month of last year. The decline from January in these states amounted to 15 per cent., while the falling off from a year ago was 25 per cent. February commercial car sales last year were slightly above those of January.

The estimate of around 23,000 units for February is based on the expectation that the rate of decline from January that prevailed in the states that have reported for the month will not be maintained in the states that are left to report. It is expected, however, that the rate of decline from last year will remain virtually the same. Seasonal influences on truck sales in various states are felt from month to month, but the rate of decline from the year before remains fairly steady, without violent fluctuation.

Among the larger states yet to report February registrations are New York, Massachusetts, New Jersey, California, Michigan, Texas, Missouri and Pennsylvania.

States which have thus far reported gains in February truck sales over a year ago are New Hamp-

(Continued on Page 8)

RAILS CONTRIBUTE LITTLE TOWARD HIGHWAY COSTS

Swayne Presents Attitude on Truck Regulation

NEW YORK, March 19.—Railroad contributions toward cost of highways are not large enough to constitute a burden of any importance to them, and motor trucks and buses are bearing a large and adequate share of the burden of providing highways, declared Alfred H. Swayne, vice-president General Motors Corporation, speaking at the noon luncheon of the Traffic Club of New York in the Hotel Commodore Wednesday, March 18.

Mr. Swayne, who is also first vice-

(Continued on Page 2)

Late News Flashes

New York, March 19—James A. Farrell, president of the United States Steel Corporation and chairman of the National Foreign Trade Council, today stated that the world-wide business depression is subsiding with gradual improvement under way.

* * *

Washington, March 19.—Secretary of the Interior Wilbur today announced that the oil conference called by the Oil States Advisory Committee to be held March 30 has been postponed until April 9.

* * *

London, England, March 19.—The late Montague Stanley Napier, the pioneer British motor car and airplane manufacturer, in his will left the sum of $3,402,000 to be used in cancer research work.

* * *

Washington, March 19.—Trade on both sides between Argentina and the United States is slumping heavily, figures from the embassy show. American exports in January are off 61 per cent. and imports from Argentina are off 64 per cent.

Motor Plant Employment Spotty, but Outlook Good

WASHINGTON, March 19.—Although the improvement in employment in automotive plants within the last month was characterized as spotty, the outlook in the industry was much better than it has been for many, many weeks, the United States Employment Service of the Labor Department announced today.

A better condition also was revealed in the iron and steel centers of the country. Production schedules were stepped up in several large iron and steel establishments and a large number of men were recalled. Large orders recently have been booked and a further gradual increase in activity and employment is expected during the next thirty days.

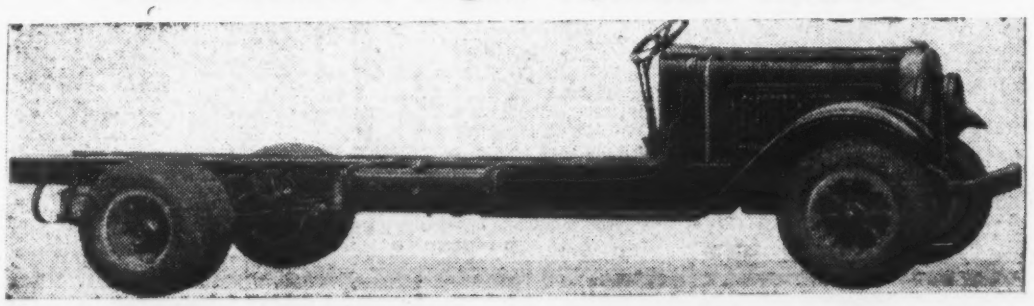
The month of February witnessed some increases in production in a

(Continued on Page 2)

TODAY

Sparks From Detroit .....Page 2
Truck merchandising methods, Page 3
Editorial, "The Bus Side"...Page 4
Contemporary comment ....Page 4
Calendar of coming events..Page 4
Making Coal Deliveries Profitable," Page 10
Cook county truck registrations in February .....Page 11
Engineering news ..Pages 14, 15, 16
... REFERENCE TABLES
Cumulative commercial car registrations for February....Page 11
Major specifications and mechanical details of commercial cars, Pages 12, 13, 14

New Stewart Eight-Cylinder Chassis



RAILS CONTRIBUTE LITTLE TO HIGHWAYS

(Continued from Page 1)

president of the National Automobile Chamber of Commerce, explained to hundreds of shippers and railroad men who were present the attitude of the motor industry in the controversy created by the demand of railway executives for legislation restricting transportation agencies, which they regard as competitive with them. The railroad point of view had been presented to the Traffic Club in January by John J. Pelley, president New York, New Haven & Hartford Railroad.

Mr. Swayne pointed out that the motor industry has always favored co-operation rather than unrestricted competition among transportation agencies and asserted that the railroads could remedy many of the conditions about which they are complaining by a greater display of initiative in co-ordinating highway and rail service so as to reap the economies inherent in both agencies of transportation.

The motor industry is in full agreement, he said, with railroads and bus operators, large and small, in their desire for Federal regulation of interstate bus traffic, adding that the purpose of this regulation should be to stabilize the bus industry and improve its service for the benefit of the public rather than for the protection of the railroads.

"Federal regulation of trucks is a much more complicated problem, and the motor industry is strongly opposed to it," said Mr. Swayne. "Legal and practical difficulties in enforcing regulation within the states have not been solved for the truck, as is the case with the bus. Shippers everywhere are anagonistic toward government control, which they fear may cripple the flexibility or increase the operating costs of truck service. Furthermore, the Interstate Commerce Commission has had no experience in dealing with highway transportation, and when a motor vehicle bureau within the commission has learned how to handle the bus problem, there will be a better opportunity to examine again the desirability and feasibility of Federal truck control."

In turning to the subject of motor vehicle taxation, Mr. Swayne questioned the wisdom of rail officials in making statements about motor vehicle taxation and railroad contributions toward the costs of highways, which he said could not be supported by facts.

"Owners of motor vehicles are paying a substantial and rapidly increasing proportion of highway costs," said Mr. Swayne.

"In 1930 a billion and a half dollars were expended for construction and maintenance of highways. Of this, two-thirds was collected in taxes from motor vehicle users alone.

"These highways have been built as a result of universal demand for personal transportation in private automobiles. They would have been built if no trucks or buses were in existence. Widespread use of commercial vehicles has given the public substantial added dividends on its highway investment.

"Special motor vehicle taxes have increased more than 500 per cent. from 1921 to 1929, while the proportion of total highway bill contributed from special motor vehicle taxes is four times greater now than in 1921.

"Much has been said about railways being taxed to build highways. The fact is that very little railway taxation gets into highways.

"In the first place a distinction should be made between the main state highways and the county and local feeder highways, which are financed differently and under different control in practically all states.

"The main, hard-surfaced highways, over which traffic considered competitive with the railroads is carried, are part of the state highway systems and are paid for out of state and Federal aid funds. They include 315,000 miles.

"Federal aid apportionments to states since their inception in 1917 have amounted to $929,000,000. This has been more than compensated for by total payments in excise taxes on motor vehicles of $1,088,000,000.

"In addition there is a much greater mileage of county and township roads which act as feeders to the main highways and to the rail lines, largely paid for by property taxes. They include 2,701,000 miles.

"In 1929, special motor vehicle tax receipts almost equaled expenditures on the main state highway systems. These expenditures were $799,000,000, while special motor vehicle taxes came within $20,000,000 of it.

"Twenty-one states do not levy general property taxes or make appropriation from their state funds for main or state road programs.

"Accordingly, railroad contributions for main state roads are so small as to be negligible. County and local highway income for feeder roads in 1929 was $758,000,000. Only 16 per cent. of this was derived from special motor vehicle taxes, and 69 per cent. came from property taxes.

"The railroad proportion of general property taxes which can be considered as applicable to local road use in 1929 was about $30,000,000, or less than 4 per cent. of the total cost."

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CHICAGO, ILL.
Warehouses in 15 Principal Cities

PHILADELPHIA ZONE CHEVROLET SALESMEN HEAR FACTORY MEN

Philadelphia, March 19.—Seven hundred retail Chevrolet salesmen met here today in Scottish Rite Temple. Factory officials conducted one of the most novel sales conventions ever attempted in the local automobile industry.

The following zone officers of the 100 Car Club, composed of star salesmen, were installed: J. P. Eden, national treasurer, Eden Chevrolet Company; H. Restein, zone president, Anders & Jervis Motor Company; R. L. Cathral, zone vice-president, H. R. Nicholson, Inc.; L. M. Roe, zone secretary, Wilmington Auto Company, Wilmington, Del.; E. T. Herdman, zone treasurer, and W. D. Wood.

This was one of the series of conventions being held by the Chevrolet Motor Company for retail salesmen, and the basic idea is to equip the local zone organization with the complete facilities to obtain its full share of the expected increase in business that is expected for spring. Preceding the convention proper, a luncheon was held at the Elks Club, following by an afternoon of instruction. Among the factory men at the convention were: H. H. Horton, regional manager, Tarrytown, N. Y.; T. H. Keating, local zone manager, and W. E. Holler of the factory sales promotion department, Detroit, Mich.

BOLT, NUT AND RIVET ASSOCIATION ENJOINED

New York, March 19.—Dissolusion of the Bolt, Nut and Rivet Manufacturers' Association, a national organization composed of about fifty of the country's largest steel and machine products manufacturers, doing an annual business of $75,000,000, was ordered yesterday by Federal Judge Frank J. Coleman under the Sherman anti-trust act. The decree enjoining the association, which controls 95 per cent. of the trade in nut, bolt and machine products from further activity, was consented to by the defendants,

MOTOR EMPLOYMENT GAINS IN FEBRUARY

(Continued from Page 1)

number of automotive factories, which resulted in additional help being engaged.

A majority of the tire factories worked below normal in the last month, but a gradual increase in activity is expected as the automobile industry expands.

Part-time employment continued to some extent in Michigan automobile and automobile accessories plants. However, general employment conditions in the Detroit industrial district showed a slight improvement. Operations in the automobile factories were still restricted and employment remained below normal.

Part time continued in automobile, automobile accessory and automobile body factories in Flint.

Operations and employment in the rubber factories of Ohio continued below normal. All manufacturing plants in Akron were running and a slight increase in employment was noted. The major tire plants continued to operate on a three 8-hour shift basis while several concerns employed four shifts.

All industrial establishments in Toledo that reported were operating, but the majority worked part-time and with reduced forces in some instances. These included automobile plants, a machine and tool shop and a brass establishment.

In Indiana part-time operations continued in the automobile and automobile accessory factories. While all plants in South Bend operated, several were on reduced schedules, being most noticeable in the automobile and automobile accessory factories and machine shops.

Production and employment in New York state automobile and automobile-accessory plants continued upward, but the level of employment remained somewhat below normal and part-time schedules were reported in a few plants manufacturing accessories.

An upward trend in operations was reported in Buffalo, principally in the automobile and allied industries, but the level of employment and production still remained below normal.

The automobile industry and plants manufacturing automobile gears in Syracuse continued on part-time schedules with reduced forces. In Yonkers the automobile plants were busy and skilled workers were fairly well employed.

Pennsylvania plants manufacturing automobile engines, bodies and accessories recalled additional workers. In the Philadelphia district factories building automobile bodies and trucks maintained a fair rate of activity, with labor fairly well engaged.

U. S. RUBBER PLANTS OPERATING AT CAPACITY

Detroit, March 19.—Announcing that the entire plant of the United States Rubber Company's tire department in Detroit is now operating at capacity schedule and with three shifts of workers, J. F. O'Shaughnessy, general manager, declared today that business is already well on the uptrend, and that the automotive industry is leading in the swing back to normalcy.

JOBBERS NAME OFFICERS

Dallas, Tex., March 19.—F. B. Ellarson has been named chairman, and Baron Wright vice-chairman, of the parts and accessory jobbers of this city for the ensuing year. Mr. Ellarson comes from Houston, and Mr. Wright from San Antonio before coming to Dallas. A meeting has been called of local jobbers for consideration of activities for the coming motor season.

GETS NEW YORK CHARTER

Jamestown, N. Y., March 19.—The Julian Combination Windows, Inc., has been organized with a capital of $75,000, to establish a local plant for manufacture and distribution of frames and other galvanized and steel and hollow metal window corrugated metal products, designed for use in automobiles, etc. Principals of the new concern and John Rockman, Karl J. Julian, Clarence E. Julin and Harvey M. Parker.

SPARKS from DETROIT

Beleevitornot

* * *

Harmonized Steering

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The Show Dates Help

* * *

Chris Sinsabaugh—Detroit Editor

WHEN A. T. N. GABRIELSSON, president of the Volvo Motorcar Manufacturing Company of Gothenburg, Sweden, visited the A. D. N. Detroit office recently he interested George Slocum and me by telling us about Anglic, a new simplified English spelling system created by R. E. Zachrisson, professor of English in the Royal University of Uppsala, a Swedish institution. It's not to be likened to Esperanto, a universal language. It's English brought down to the last notch of simplicity, a cosmopolitan vocabulary English, the easiest language for the greatest number of people, it is declared.

As Mr. Gabrielsson sees it, the development of Anglic would mean a greater ease of communication between this country and the foreign ones, a vocabulary not necessarily intended to be learned by English and Americans, but by those who write other tongues but who need a common language for use in the export and import world. He thinks Anglic will fill this bill—easily learned by foreigners. English, he says, is spoken by more than two hundred million people and is the administrative language of five hundred million.

* * *

SO we wrote to Prof. Zachrisson for further details, and in reply we have received a letter, which says: "In replie to your letr of Febr. 12, I have much plezhr in forwarding to you our larj Anglic pamflit and a spesimen kopy of our paepr Anglic. We shal be much obliejd for eny asistens in maeking Anglic noen in America, espeshaly by subskripshon to our paepr for which we enkloz sum ordr forms."

That's the way Anglic looks in cold type, but to get a clearer idea about it, let the column reprint a paragraph from Lincoln's Gettysburg speech, as follows:

"Forskor and sevn yeerz agoe our faadherz braut forth on this kontinent a nue naeshon, konseevd in liberty, and dedikaeted to the propozishon that aul men ar kreated eequel."

* * *

THAT harmonized principle of steering developed for the Cadillac sixteen by that company's chief engineer, E. W. Seaholm, was brought about only after a thorough study of the art of driving. As a result of his investigations, Mr. Seaholm has the following suggestion to offer:

"For the best control at high speed, the two hands should grasp the wheel at points approximately opposite each other. The palm of the left hand should be under the rim, with the fingers gripping upward, thus allowing the left arm and hand to serve as a brace. The palm of the right hand should be on top of the rim, with the fingers gripping downward, thus affording the greatest and most quickly available leverage.

"For the most comfortable position, both hands should rest lightly, with palms down, on the lower section of the steering wheel.

"Driving with one hand, or steering by holding the spokes of the wheel, may be resorted to as an occasional measure of comfort, but it is bad practice, owing to the fact that it makes close control of steering difficult in an emergency."

* * *

SETTING the national show dates each a week later in the year is something the industry should appreciate. Most always we have had to skip New Year's at home in order to be at New York for the Grand Central Palace opening. With January 9 as the curtain-raiser men of the industry will be able to clean up their social obligations instead of being torn between love and duty as has been the case in the past. Undoubtedly January 9 will bring more of the big factory folk to the opening than the old date used to.

Another thing, with the new model announcements all coming out at about the first of the year, factories will have more time to get the new models to New York than would be the case if the show started January 2. Personally, I will benefit in that for the first time I can remember I can celebrate my birthday, January 5, in the bosom of my family. So the approval is unanimous.

Boosts Sale of Heavy Duty Units Through Salesmanship

Mack Truck Branch in Connecticut Disposes of 24 Trucks in January, When Sales Resistance Is At a High Point

EMPLOYMENT of salesmen who can talk to prospective buyers in their own language as far as technical terms and conditions are concerned, has enabled the New Haven branch of the Mack Motor Truck Company at 151 Orange Ave., West Haven, Conn., to make a remarkable showing in sales of heavy-duty units for road construction work.

During January and February, with sales resistance at a high point, the Mack dealership sold twenty-four trucks, sixteen of which were for road building, according to F. L. Johnson, sales manager. Mr. Johnson reported that sales outside of the construction field have been slow, due to a tendency on the part of many truck fleet owners to keep their old units in service as long as possible. Necessary replacements, however, are beginning to be made, he says, and a gradual uptrend is envisioned. Prospects for the spring are said to be encouraging.

The two salesmen employed by the Mack New Haven branch are men of wide experience in the truck field. They are more than forty years of age and have a broad general knowledge of trucks in general and Macks in particular. Both are able to knock down and reassemble the entire mechanical equipment of a truck, so great is their familiarity with the units, Mr. Johnson says.

In discussions with road-building contractors to whom they are seeking to sell trucks, either of these men can talk professionally regarding technical points of excavation. Difficulties in handling of earth and rock, formations encountered and other features of road building, are discussed in the technical language of the contractor, thus gaining his confidence and respect.

These men, through long experience, understand thoroughly the part played by a truck in any specific operation, and are prepared to discuss matters which ordinarily would be understood only by the contractor himself.

The New Haven contracting firm of C. A. Willoughby, Inc., recently bought ten Mack heavy duty units for road-building work. These trucks were of high clearance with side boards, designed to carry seven and one-half tons of dry material for delivery to the concrete mixer at the scene of the job.

JOHN H. KELLY JOINS THERMOID RUBBER CO.

Trenton, N. J., March 19.—The Thermoid Rubber Company, manufacture of mechanical rubber goods, announces that John H. Kelly has joined the staff. Mr. Kelly started with the B. F. Goodrich Company in 1898 and from there went to the Republic Rubber Company, where he rose to vice-president in charge of sales by 1912. Later Mr. Kelly became president of the Hewitt Rubber Company and when this organization entered the Gutta Percha Rubber Manufacturing Company-Robins Conveying Belt Company merger, he assumed the vice-presidency in charge of sales.

Since 1928 when Mr. Kelly was forced to retire from active duty due to a serious illness, he has been doing special counselling work.

CERAMIC SOCIETY HONORS FESSLER OF A. C. SPARK PLUG

Cleveland, March 19.—The American Ceramic Society at its thirty-third annual meeting here conferred a fellowship upon 32-year-old Albra H. Fessler in recognition of his notable contributions to the ceramic art and industry. Mr. Fessler, who is head of ceramic research of the AC Spark Plug Company, is said to be the youngest member of the society to ever attain a fellowship.

CLASSIFIED ADVERTISEMENTS IN THE AUTOMOTIVE DAILY NEWS BRING RESULTS

FORD COMMERCIAL EXHIBIT OPENED IN INDIANAPOLIS

INDIANAPOLIS, Ind., March 19.—The new Ford Commercial Exhibit, Inc., was opened here this week with the various Ford commercial body types and chassis on display at 1133 North Meridian St., in the heart of automobile row, where a permanent exhibit similar to those already established in New York, Detroit and other large centers will be maintained.

A full line of colors as well as models also is being shown in the display, which has attracted a great deal of public interest. The new showroom, in which fifteen Indianapolis Ford dealers are co-operating in maintaining, is in charge of W. N. South, who has had wide experience in the commercial field.

Mr. South, who came to Indianapolis in 1914, is a veteran of the World War naval flying service. He returned to Indianapolis after the war to become a traveling representative of the J. D. Adams Company, manufacturer of road building and maintenance equipment, and in 1922 turned retail salesman with a local dealer. In a subsequent connection with the Jumbo Equipment Company he traveled extensively over the various Middle Western and Southern states and is recognized as a thorough truck transportation cost analyst, especially in the semi-trailer and six-wheel equipment division.

FRANCES WORKS MANAGER FOR DITTMER GEAR CO.

Lockport, N. Y., March 19.—The appointment of Charles G. Frances as works manager of the Dittmer Gear and Manufacturing Corporation was announced today by A. H. Dittmer, president. Mr. Frances comes to the Dittmer Corporation from Rochester, where he was superintendent of the Cunningham Motor Car Company. He has been identified with the automotive industry for the past twenty years.

Movement to Train Truck Drivers in Chicago Grows

CHICAGO, March 19.—Results of a survey just completed and announced today by the Illinois Manufacturers' Association bring to light that 37 per cent. of the motor truck operators reporting to a questionnaire have truck-driver training systems and that 75 per cent. "are doing something to encourage better driving."

The survey was conducted by James L. Donnelly, executive vice-president of the association. Discussing the results, the survey continues:

"In terms of the trucks these manufacturers operate, the showing is even better than the figures reveal. It is generally the practice among members of the association to select drivers according to prescribed qualifications, to take pains in properly instructing new drivers, to reward good performance on the part of drivers by bonuses, salary increases or other means, to have printed or posted rules for safe driving and to require the report of all accidents on special forms.

The driver-training plan, according to Mr. Donnelly, "not only has tended to reduce the number of accidents but operating costs as well, and additionally, increases business by building good will."

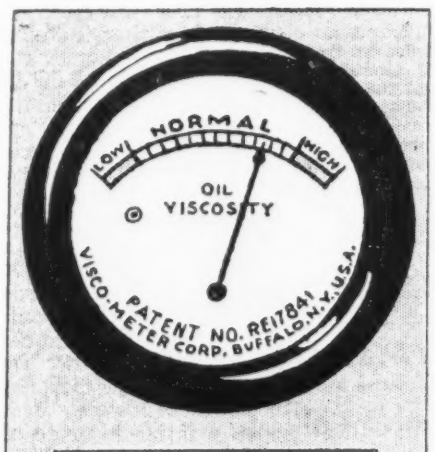
Participating members of the association hung up a remarkable record on the ratio of one accident to 9,572 miles of operation.

OPENS DISTRICT OFFICE

Buffalo, March 19.—Richfield Oil corporation has opened a district sales office in the Jackson Building in Delaware Avenue under the management of William H. Hollister. More than 100 dealers in gasoline were guests at a dinner held in the Pickwick Arms Hotel, Fort Erie, Ont., in connection with the opening of the district office.

Right before your eyes . . .

A CONTINUOUS ANSWER TO "How's Your Oil"



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Visco-Meter takes up the job of motor protection where the oil pressure and oil level gauges leave off. Heat, cold, dilution, deterioration and all the other factors that affect an oil's ability to lubricate are constantly checked . . . and made conspicuous to the driver. Here is the best kind of insurance against faulty lubrication.

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Dealers are finding this substantially built, easy-to-use Visco-Meter instrument mighty profitable—practically a "self seller". And it goes a long way to gain customer goodwill . . . Let us send you full details and our new, helpful booklet "A Practical Test for Viscosity". Tear off this corner of the page and send with your name and address, to the Visco-Meter Corporation, 310 Grote Street, Buffalo, N. Y., or 6-247 General Motors Bldg., Detroit, Mich.

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Takes the Guesswork out of Motor Lubrication

Automotive Daily News

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The Bus Side

AT the present time we are hearing and reading almost continuous presentations of the railway's side of the argument in its campaign against motor bus transportation. The bus people have not been particularly vocal, yet their side of the case is not only logical, it is convincing. Recently G. E. Wickman, who is president of the Greyhound Corporation, which operates the largest fleet of transcontinental buses in the country, made a statement which is well worth reading.

"Proposals now pending in many state legislatures," says Mr. Wickman, "would, if enacted, stifle the future public service of the bus industry, by imposing grossly unfair and discriminatory taxation and regulation which are altogether unnecessary in the public interest."

Mr. Wickman then calls attention to the relatively heavy taxation now inflicted on bus operation:

"Railroads, buses and private automobiles are now the principal means of passenger transportation within the United States, but the number of bus passengers annually is only 3 per cent. of the total using public highways.

"Annual taxes paid by motor buses amount to 7.2 cents out of every dollar they take in. All public utilities, including railroads, pay average taxes of 4.5 cents out of every dollar they receive.

"More than 85 per cent. of special bus taxes go directly into highway funds for improvement and maintenance.

"Unreasonable taxes will have two serious effects: (1) To increase the cost of transportation to bus passengers and thereby discriminate against them in their use of the highways; (2) To force many useful bus lines out of business.

"Service, rates, equipment, personnel, etc., are now supervised by state authority identical with or similar to commissions which regulate railroads and other public utilities.

"Forty-six states regulate buses by requiring a certificate of convenience and necessity; by requiring public liability or indemnity insurance; by regulating rates, facilities, hours of service and safety of operation in all particulars.

"Nearly 2,000 rules regulating bus operation in the United States have already been established by state legislation, covering practically everything concerning motor bus operation from minute mechanical details to the schedules upon which service is rendered.

"Progressive leaders in the transportation industry recognize that the bus, when properly co-ordinated with rail transportation, will never seriously invade the railway field. It occupies a distinctive field of transportation. They believe, too, that, properly and fairly regulated, the bus can also be made even more useful as a supplementary service to railroad transportation. The motor bus has grown rapidly because of the public convenience and necessity which it serves. Much of its intrinsic advantage comes from the fact that it can carry large and small groups of passengers at great frequency of schedule, with a minimum of equipment, and transport passengers in many instances nearer their destinations. It is economical, yet enjoys no subsidy or special privilege. It more than pays its share of highway improvement and maintenance."

ON a recent occasion a visitor to Henry Ford's home was surprised to see a caravan of twenty brand new Model A's, fresh from the factory, draw up at the manufacturers' front door. He was more surprised when Henry Ford in person, not a moving picture, went down the steps and began an inspection of the cars. He looked over the engines of some, tested the electrical system of others, tried the wheels of several, and in some cases actually crawled under a car and performed weird rites while gazing upward. Then the visitor learned that this was just Mr. Ford's way of checking up on how well the assembly line was doing its job.

FORD OF CANADA EXPECTS TO BREAK OUTPUT RECORD

Montreal, March 19.—Ford Motor Company of Canada hopes to exceed last year's record production of 70,000 cars, Wallace R Campbell, president of the company, told the Automotive Daily News, on his arrival here from a survey of conditions in western Canada. The company also hopes to increase its expenditures in Montreal, where last year it spent $1,650,000 on materials. The fact that the number of commercial cars purchased in Montreal is increasing was pointed to by Mr. Campbell as an encouraging sign and a good business omen. "There is lots of business in sight all over the country, although some of it is hard to get," he declared. He found the West, contrary to the views of the gloom-casters, "confident and optimistic."

G. M. EXPENDITURES REACH LARGE TOTAL IN CANADA

Montreal, Quebec, March 19.—General Motors of Canada, Ltd., spent $812,008 in Montreal last year in salaries and material for the construction of cars and trucks, E. A. Everson, manager of the Montreal zone, revealed in an address before a dealer gathering last night. He declared that the products of General Motors of Canada are truly national.

"From all parts of Canada come the materials that go into the making of General Motors cars," he said. "In wages, general expenses, and purchase of goods, General Motors spent in Canada last year a total of $27,564,874. These figures do not include the $8,000,000 to $10,000,000 paid to the government in duties, excise and sales taxes, the dividends paid to Canadian shareholders, or the other direct benefits to Canadians."

AUTOCAR MOVES FACTORY BRANCH TO NEW PLANT

Philadelphia, March 19.—The Philadelphia district factory branch of the Autocar Company of Ardmore, Pa., has been moved from 23d and Market streets, where it was located for twenty years, to its new $300,000 building at 34th Street and Indiana Avenue.

CHEVROLET MEETING

New Brunswick, N. J., March 19.—Twenty-five Chevrolet dealers from towns in this district attended a district luncheon held at the Woodrow Wilson Hotel. Curtis Godwin of New York presided and addressed the men on developments in the company and good salesmanship.

COMING EVENTS

MARCH

15-28—**Los Angeles, Cal.** Pacific Coast Transportation Exposition.
16-22—**Los Angeles, Cal.** Second Annual Oil Equipment and Engineering Exposition.
19-21—**San Antonio, Tex.** Sixteenth annual meeting, American Association of Petroleum Geologists.
24-25—**Trenton, N. J.** Automotive Equipment and Parts Show.
30-April 3—**Indianapolis, Ind.** Eighty-first meeting, American Chemical Society.

APRIL

Milwaukee, Wis. Production meeting Society Automotive Engineers.
11-13—**Seattle, Wash.** Washington Motor Freight Association convention.
11-19—**Detroit, Mich.** Aeronautical Chamber of Commerce convention.
16-17—**Milan, Italy.** International Automobile Salon.
20-23—**Birmingham, Ala.** American Society of Mechanical Engineers, meeting.
28-May 1—**Atlantic City, N. J.** United States Chamber of Commerce, convention.

MAY

4- 9—**Charlotte, N. C.** Good Roads Convention.
4- 9—**Washington, D. C.** International Chamber of Commerce, convention.
9-Aug. 9—**Berlin, Germany.** International Garage Exposition.
13-14—**Tulsa, Okla.** American Petroleum Institute, first mid-year meeting, Mayo Hotel.
15-16—**Detroit, Mich.** Society of Automotive Engineers, nineteenth aeronautical meeting, Book-Cadillac.
27-29—**New York City.** National Foreign trade Council.

JUNE

8-12—**Chicago, Ill.** Radio Manufacturers' Annual Show.
15-18—**Madison, Wis.** American Society of Mechanical Engineers, Oil and Gas Power meeting.
15-19—**White Sulphur Springs, Va.** Annual summer meeting, Society of Automotive Engineers.
22-26—**Chicago, Ill.** American Society for Testing Materials, annual meeting

SEPTEMBER

26-Oct. 2—**Atlantic City, N. J.** Annual meeting, American Electric Railway Association.

NOVEMBER

16-12—**Chicago, Ill.** Annual meeting, American Petroleum Institute, Hotel Stevens.

Contemporary Comment

IT is said that a motor vehicle operator, licensed in Washington, D. C., and versed only in the traffic regulations of that community would violate the law 300 times in a single trip to New York if he followed the Washington code throughout. "Just another dumbbell from the sticks," would be the average traffic cop's reaction at any point from Baltimore to Newark. On strength of which the poor untutored sap would doubtless make his destination without reporting to a magistrate.

If the day ever comes when contempt for the intelligence of foreign licensees fails to keep our through traffic moving in spite of highway codes that clash at every crossroads, no interstate trip of fifty miles or more will be a safe adventure for any but a plutocrat.—**Credit Where Credit Is Due.**

* * *

LATEST news from abroad would indicate that there is again some serious talk of restriction being revived. The new plan seems to hinge on the acceptance by the Dutch of Sir George Maxwell's suggestion that production be cut 25 per cent. from the 1929 output in British areas and Dutch East Indian estates and the export duty on native production from the D. E. I. be raised to 10 per cent. The constantly mounting stocks in the chief trading centers and the dilemma facing the plantation interests give rise to the rumor that, this time, the conversations on the subject of restriction will be pursued with genuine seriousness.

A new and interesting basis for calculating the degree of restriction necessary to bring about some equilibrium between the present huge supplies and the curtailed demand for crude rubber, comes in the proposal of the well-known firm, Symington & Sinclair, London, that authoritative estimates of probable consumption for the next two years be attempted through the co-operation of the various rubber trade bodies. With the establishment of such figures, the plantation interests will have a basis on which to adjust their production so that accumulated stocks can be worked off within a reasonable time.

* * *

IT is an accepted fact that participation in races is an expensive business. Special cars must be built, expert drivers engaged, and a well-trained personnel kept regularly employed on their maintenance.

Moreover, whatever the value of racing as a means of developing the automobile as a whole, the results of races do little to help the ordinary motorist in the selection of his new season's model.

Reliability trials, on the other hand, enable the public to see how the cars in which they are interested behave under conditions admittedly strenuous, but which might be met with any day by a tourist exploring by-roads, and certainly by a colonial driver proceeding on his lawful occasions.

For this reason it is difficult to understand why all Brooklands races and speed trials, the two big road races in Ireland and the Shelsley Walsh "open" hill-climb are approved, while a ban is placed upon such useful and popular events as some of the classic reliability trials, of which the London to Land's End run of the Motor Cycling Club is a shining example.

And a further anomaly is that, while reliability trials in Great Britain are banned by authority, similar events in Ireland and on the continent are approved.

Across the channel such events as the Monte Carlo Rally, the Tour de France, or the Coupe des Alpes are regarded by the motoring public as more valuable tests than a grand prix race. It is a pity that in this discrimination such a fetish is made of speed and the less spectacular but equally useful reliability trials are not encouraged.—**The Motor (England).**

* * *

ADD: AUTO-INTOXICATIONS

"One-eyed" autos.
Traffic lights where there is no traffic.
Hit-and-run drivers.
The mounting toll of auto fatalities.
Smart drivers too busy to fix their defunct brakes.
Motorcycle patrolmen hiding behind bushes to prey on motorists.
"Sassy" traffic cops.
Soliciting of fees for watching parked cars.
Spending taxes paid by motorists for any other purpose than highway improvement.
Lack of directional and speed signs.—**The New York Automobile Club Review.**

* * *

THERE was a slight improvement in the automotive market during January, but not to the extent expected. Usually the French manufacturers increase their productions in January, but this year the schedules of many companies have been reduced, since existing stocks are ample to supply the demand. One leading French manufacturer is reported to be releasing more workmen. Confidential reports indicate that the demands for the new model Mathis are increasing sharply and that 5,000 American motors have been ordered for use in this model. Used cars are moving very slowly.—**Foreign Trade.**

Car Ownership by Survey Districts in New York City, 1925-1930

BUICK				
District	*1925*	*1930*	*Increase*	*%*
Above $5,000	8,527	10,559	2,032	12
$4,000-4,999	8,655	12,070	3,415	20
$2,000-3,999	16,213	27,077	10,864	64
Under $2,000	1,758	2,386	628	4
ESSEX				
Above $5,000	1,238	2,355	1,117	10
$4,000-4,999	1,810	3,693	1,883	18
$2,000-3,999	4,041	11,234	7,193	68
Under $2,000	375	820	445	4

Source: The News 1925 registration study, and current analyses. District designations are from the New York Survey of the Bureau of Business Research, New York University, 1923-25.

BUICK and ESSEX make most New York sales to middle-class customers!

SINCE 1925 registrations increased 153,704 cars in New York City. Of these, 100,052 cars were in middle-incomed ($2,000-$4,000) districts . . . but only 19,318 in above-$5,000 districts! Five times as many of the *new* owners are middle-incomed. Today, the middle-class districts have three times as many cars as wealthy districts —269,257 in $2,000-$4,000 districts, 85,837 in over-$5,000 districts!

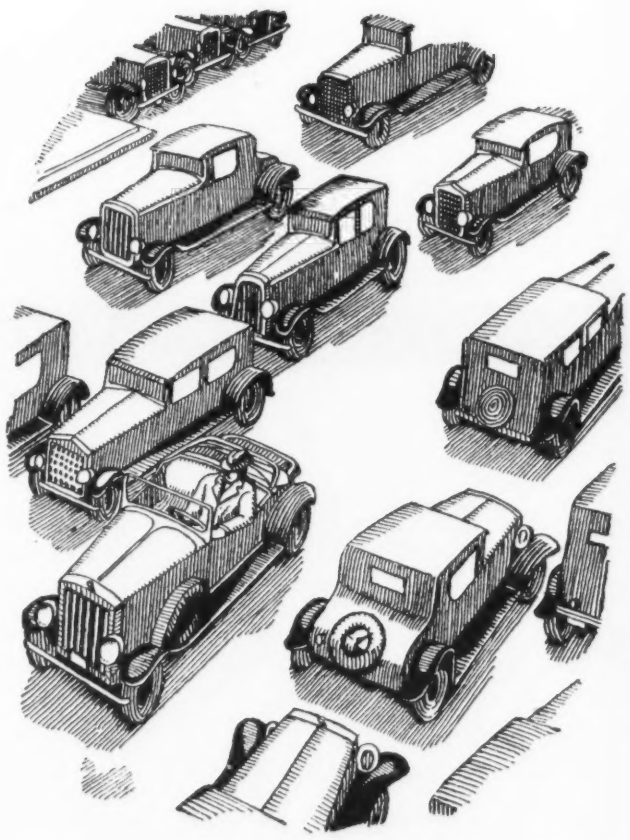
The middle class—ordinary folks with ordinary incomes —number the most new owners for practically all cars. For instance:

Buick ownership in New York City increased 16,939 cars since 1925. But 64% of the increase, 10,864 cars, was in middle-incomed districts. High-incomed districts gave only 12% of the increase, have only 2,032 more Buicks than five years ago! Today, middle-incomed New York owns 27,000 Buicks—high-incomed, 10,500!

Essex registrations increased 10,638—of which middle-incomed districts accounted for 68%, high-incomed only 10%! Today the middle class owns 11,000 Essex—the high-incomed 2,350!

As registrations mounted, new car sales climbed. New car sales to the middle class have been steadily bulking larger. Last year they bought 53% of all cars sold here —took 50.3% of all Buicks and 56.8% of Essex. The middle-incomed districts are now the biggest volume buyers of new cars—and the fastest growing!

THIS expanded market needs a different advertising distribution. Old media of small circulation, which gave adequate coverage when the market was small and buyers few, cars higher priced and more exclusive—fail to reach families in the new middle-incomed market. The paper which carries most automotive advertising reaches only 11% of the families in these middle-incomed districts—the second paper only 7%.



The News, with huge circulation exceeding 1,350,000 weekdays and 1,890,000 Sunday, taps the whole market. It reaches 588,000 middle-incomed families, has more readers in middle-class districts *alone* than any other New York paper has in the entire city! It gives most coverage where you get most sales. And in wealthy districts, it has more circulation than any "class" paper—and more in the growing suburban market! It will bring more 1931 sales —because it talks to more of the 1931 market . . . more effectively, on smaller pages of higher visibility, at lower cost. Consider!

THE NEWS

NEW YORK'S PICTURE NEWSPAPER

NEWS BUILDING, 220 EAST 42nd STREET, NEW YORK

Tribune Tower, Chicago + Kohl Building, San Francisco

NEW STEWART EIGHT DESIGNED FOR HIGH, SUSTAINED ROAD SPEED

(Continued from Page 1)

which are heavy duty units. The overdrive gear permits slower engine speeds on long, fast runs. Large openings are provided for power take-off.

The gear ratios are as follows, standard unit power plant transmission: Low, 6.92:1; second, 3.47:1; third, 1.89:1; fourth, 1:1; reverse, 8.06:1.

The auxiliary transmission has three speeds. High, 1:1; overdrive, .67:1; low, 2.25:1. With standard rear axle ratio of 7.3:1; then the total gear reductions in low are as follows: First, 114:1; second, 56.9:1; third, 31:1; fourth, 16.4:1; reverse, 132:1.

There is a 2¼-inch tubular shaft, three-joint type, equipped with large metal-covered dust-proof joints. Center joint supported on S. K. F. self-aligning ball bearing contained in oil-tight and dust-proof housing.

The front axle is a heavy drop forged "I" beam of the reverse Elliott type. Timken bearings are used in the wheel hubs. Ball thrust bearings are provided on king pins. Tread is 66-inch, which insures short turning radius.

The rear axle is a Timken full floating, truck type, double gear reduction. Worm drive is optional. The housing is made of pressed steel, with heavy nickel steel reinforcing sleeves. The differential is the block type and has four large differential pinion gears. The axle shafts are made of nickel chromium alloy steel, heat treated. Both differential and wheels are mounted on large Timken roller bearings.

Ratios on double reduction are 7.3:1 standard. Special ratios at extra cost are 6.3:1 and 8.1:1.

Ratios on worm axle are 7.25:1 standard. Special ratios at extra cost are 6:1 and 8.66:1.

Radius rods are standard equipment. Rear axle tread 72⅜ inches, with dual pneumatic tires.

The front springs are 40 inches long by 3 inches wide, and have fourteen alloy steel leaves. The rear springs are 56 inches long by 3 inches wide. The main spring has fifteen leaves of alloy steel and the auxiliary springs have six leaves. Auxiliary springs are standard equipment.

The steering gear is a Ross cam and lever, roller type, with low ratio for easy steering. A 20-inch diameter steering wheel is provided.

The side rails of the frame are 9 inches deep by 9-32 inches thick, heat-treated, special high carbon steel.

The service brakes are Bendix Duo-Servo four-wheel, mechanically operated by rods on the rear and cable on the front. Size of the front brakes is 16 inches by 2½ inches, and the rear 17¼ inches by 4 inches. B-K vacuum booster brake is standard. The hand brake is the contracting type mounted on the drive shaft flange at the rear of the transmission. Size, 11 inches diameter by 5 inches wide.

Tires are 9.00-20 inches base balloons. Dual rear are standard. Special 9.75-20 balloons at extra cost.

The wheels are cast steel hollow spoke type.

The gasoline tank holds thirty-one gallons, is mounted on the side of the frame and is standard equipment. Special thirty-gallon tank under the seat at extra cost.

Engine-driven fuel pump supplies gasoline to the carburetor. Gasoline gauge on side-mounted tank is standard equipment.

The radiator is of the vertical-tube type, with extra large cooling capacity. Circulation is provided by a water pump, and the temperature is thermostatically controlled. The radiator shell is of polished cast aluminum.

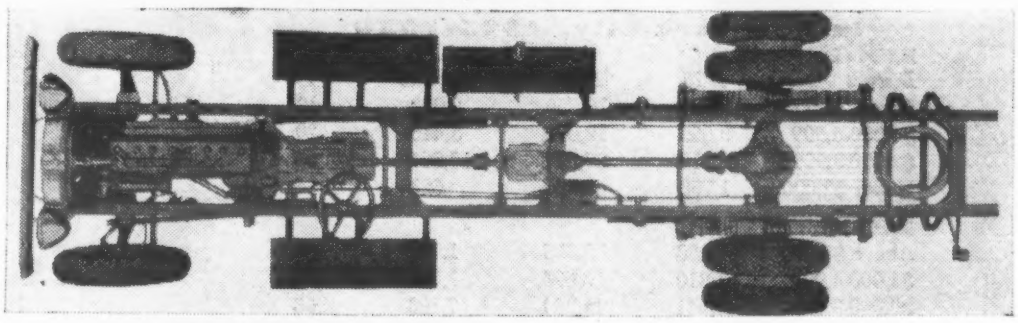
The standard wheelbase is 170 inches. Special wheelbases at extra cost, are 196 inches, 226 inches and 241 inches. The chassis lengths will accommodate body lengths from 11 feet to 18 feet.

Equipment provided includes electric starter and generator, electric lights, cowl side lights and horn, battery, tool kit, jack, spare tire carrier, spare rim, front bumper, speedometer, windshield wiper and mirror on all cabs and bodies, air cleaner, thermostat, stop light and Alemite grease gun. The natural wood finish steel instrument board is equipped with ammeter, oil gage, starting choke button, lighting and ignition switch with indirect lighting and manifold heat control button.

Painting is standard as follows: Hood, cowl and chassis Stewart green, sides and aprons finished in baked black enamel. Wheels Stewart red.

The chassis weight on the standard wheelbase is 7,600 pounds.

Stewart Eight-Cylinder Chassis



PLAIN VIEW showing location of units of new Stewart 3½-ton chassis

The New Stewart Eight Motor Trucks

POWERED BY LYCOMING

The New Stewart Eight Cylinder Motor Trucks, announced today, are equipped with

Model AE Lycoming Engine, Eight Cylinders, 130 H. P., L. Head Type, 3¾x4¾; Piston Displacement, 420 inches.

A Straight Eight Engine designed especially for the requirements of commercial car use.

Here is concrete evidence that this commercial car manufacturer appreciates these

ADVANTAGES OF AN *EIGHT* FOR TRUCKS

1-Smooth power; less vibration
2-Speedier than "6" of same H.P.
3-Less weight per horse power
4-More satisfied drivers . . . .
5-No greater maintenance cost
6-More ton miles per year . . .
7-Next step in truck progress
8-Follows passenger car trend
9-Especially suited to long hauls
10-Use "6" or "8" on same chassis

NOTHING FINER CAN BE SAID OF ANY MOTOR VEHICLE THAN IT IS POWERED BY LYCOMING

LYCOMING MOTORS

LYCOMING MANUFACTURING COMPANY
WILLIAMSPORT, PENNSYLVANIA

CRAGAR BUYS MILLER AND SCHOFIELD HOLDINGS

Los Angeles, March 19.—Machine equipment and patent holdings of the Miller Production Company, builder of racing cars, and Schofield Incorporated of America, automotive equipment manufacturer, valued at more than $250,000, have been purchased by the newly organized Cragar Corporation, and will be moved to the latter concern's plant in Hollywood, according to Harlan Fengler, vice-president and general manager of the Cragar Corporation. The Cragar Corporation, by this purchase, brings its investment up to $750,000, making it the largest experimental and production engineering plant west of Chicago.

CHARLOTTE, N. C., DEALERS STAGE AUTOMOBILE SHOW

Charlotte, N. C., March 19.—With approximately $150,000 worth of beautiful cars on exhibition and practically every automobile dealer in the city participating, Charlotte's big automobile show got under way today at the Armory-Auditorium. Osmond L. Barringer, one of the state's best known automobile authorities, will be in charge of the show.

ELMWOOD MOTORS, INC., TO SELL HUDSON-ESSEX

Danbury, Conn., March 19.—Elmwood Motors, Inc., has been formed to handle the Hudson-Essex line, with showrooms at 89 Main St. Willis R. Tomlinson and Roland M. Gero are heads of the concern, which replaces the branch dealership of the Erwin M. Jennings Company, Bridgeport Hudson-Essex distributors, at the same address. Mr. Tomlinson and Mr. Gero were formerly connected with the Jennings branch.

FORM SERVICE FIRM

Danbury, Conn., March 19.—United Auto Service Corporation has been formed by Joseph L. Hill, Walter K. Czuda and Bertha R. Eastman, with quarters at 115 South St. The concern will handle Bendix, Lockheed, Stewart-Warner, Delco-Remy and Lovejoy products.

STEEL SHEET, STRIP OUTPUT REACHES PEAK FOR YEAR

Youngstown, O., March 19.—Steel sheet and strip production, a large proportion of which is going into automobile bodies and fenders, continues to increase gradually for Youngstown district manufacturers. As a result of such gains, steel operations in the district reached 51 per cent. in the current week, the highest level attained this year.

Sheet mills of the district are at approximately 53 per cent. of capacity, compared with about 50 per cent. last week, and schedules are somewhat more stable than a month ago, permitting a more accurate estimate of week-to-week fluctuations. During the current week two sheet manufacturers increased schedules slightly, while three reported schedules unchanged from a week ago. At Niles, O., where much of the sheet capacity of the Mahoning Valley is concentrated, thirty-one sheet mills are now under power, a gain of three over last week, and the largest number to roll in any week this year.

The Mahoning Valley Steel Company's small sheet plant at Niles is rolling at capacity, a gain of 25 per cent. over a week ago, while Empire Steel Corporation is lifting production slightly at the Falcon plant. Thirteen mills were operating Monday and fifteen are expected to be rolling today. The Thomas & Waddell plants, active this week a year ago, continue idle, pending further improvement in the sheet metal trade.

Activity at Sharon Steel Hoop Company's sheet plant in Youngstown is again at capacity, with all mills rolling yesterday. Strip mill operations for this company are down to 20 per cent., but a gain is expected later in the week. Ingot production for Sharon Steel is unchanged from a week ago at 50 per cent. Average operations are 63 per cent., against 80 to 90 per cent. in the corresponding seven-day period of 1930.

Newton Steel Company, another important maker of sheets, of which a large proportion go to Ohio automobile parts makers, reports no change in the 70 per cent. rate of operations at its Ohio plant while activity at the company's Monroe plant is getting under way. Newton's plant has shown a run of many weeks at this level.

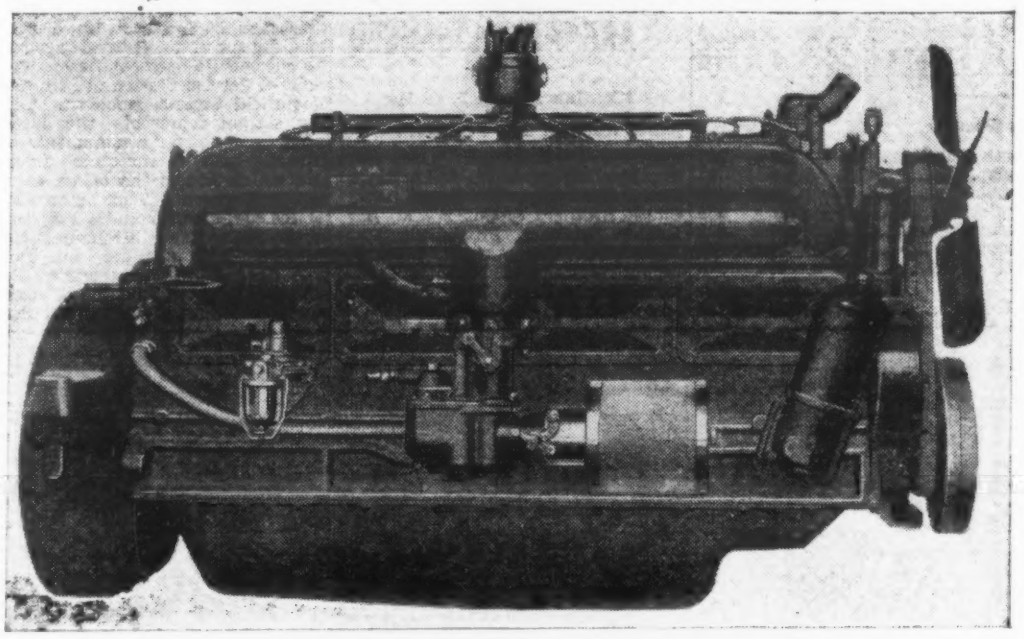
A leading official of Truscon Steel Company reports that the company's bookings will be 60 per cent. higher in March than in January and 30 per cent. higher in March than in February. While the company is a large fabricator of highway and building construction steel, part of its manufacturing activity is at its Cleveland plant, which caters to the automobile industry.

The larger steel companies, such as Carnegie Steel Company, Youngstown Sheet and Tube Company and Republic Steel Company, report no important change in operations compared with a week ago. Carnegie plants in the Valley are operating at 50 per cent., as in each week except one of the last four months. Sheet and Tube plants are again at 40 per cent. and Republic Steel Company plants in the district are at 58 per cent., unchanged for the last several weeks.

A number of encouraging factors continue to stimulate Mahoning Valley industry. Automobile steel demands are creeping upward at a slow but clearly perceptible pace. Eleven blast furnaces, representing the primary process in the steel industry, are melting in the Shenango and Mahoning valleys, against only two in the last week of December. This number was to be increased to twelve with the blowing in of the Shenango Furnace Company's stack at Sharon, Pa., in the current week.

Further encouragement is found in a statement by J. T. Broadbent, president of Standard Textile Products Company, which maintains a plant near Youngstown. "It is encouraging, however, to report that the company's business is decidedly better during the last few weeks," he said. "That part of the company's business which caters particularly to the automobile trade was severely hit in 1930 by the fact that the automobile industry also was depressed."

Lycoming Power Plant in New Stewart



VANCOUVER, B. C., DEALERS LOSE UNDER NEW TARIFF

Vancouver, B. C., March 19.—Declaring that it is impossible for them to compete with other companies that either manufacture or assemble their product in Canada, a number of Vancouver automobile dealers are now endeavoring to obtain permission from Ottawa to admit cars which were on order at the time the order providing a 20 per cent. discount rate was promulgated, admitted under the old rate.

Ten Vancouver firms are seriously affected by the order from the federal government, and many cars ordered before the new ruling came into effect are being held in bond. The companies are making application to Ottawa to have these admitted under the old rate.

WILL SERVICE CHEVROLET

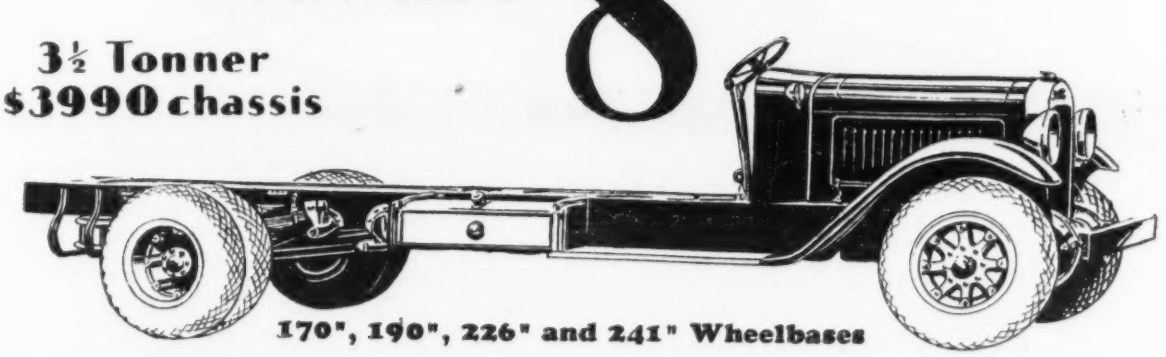
Rochester, N. Y., March 19.—Specializing in Chevrolet service, William Garvin has established the Garvin Garage at 14 South Union St. Other features of the new plant are mechanical, electric and body-working facilities, with complete greasing and lubrication service.

THE SENSATION OF THE TRUCK INDUSTRY

THE NEW **Stewart 8**

50 to 60 miles per hour with load

3½ Tonner $3990 chassis



170", 190", 226" and 241" Wheelbases

Still another Stewart triumph! This time an "8" developing 130 horsepower, capable of 50 to 60 miles an hour. A marvel of power and speed for long, fast hauls. The new Stewart "8" is rugged, powerful, yet smooth and vibrationless. Its heavy duty motor is designed for gruelling work. No road is too rough, no job too tough for this "8".

From radiator to tail light, it's an honestly rated truck built by exclusive truck makers. The new Stewart 3½-tonner, like all Stewart models, is built to give years of constant service.

If your demands include long, fast hauls at low operating cost, get "America's Greatest Truck Value" on the job. Let Stewart performance prove Stewart claims. A ride behind the wheel of this new Stewart "8" will amaze you.

Free catalog sent upon request.

MODELS

Bevel Axle

1	ton,	4 Cylinder	$695
1	ton,	6 Cylinder	$795
1½	ton,	4 Cylinder	$895
1½	ton,	6 Cylinder	$995
1½	ton,	6 Cylinder	$1195
2	ton,	6 Cylinder	$1495
2	ton,	6 Cylinder	$1695
2½	ton,	6 Cylinder	$1990
3	ton,	6 Cylinder	$2390

Worm Axle

2	ton,	6 Cylinder	$2290
2½	ton,	6 Cylinder	$2690
3	ton,	6 Cylinder	$2990
3½	ton,	6 Cylinder	$3690
3½	ton,	6 Cylinder	$3990
3½	ton,	8 Cylinder	$3990
5	ton,	6 Cylinder	$4990
6-7	ton,	6 Cylinder	$5700

Double Gear Reduction Axle

2½	ton,	6 Cylinder	$2690
3	ton,	6 Cylinder	$2990
3½	ton,	6 Cylinder	$3690
3½	ton,	6 Cylinder	$3990
3½	ton,	8 Cylinder	$8990
5	ton,	6 Cylinder	$4990
6-7	ton,	6 Cylinder	$5700

Fire Apparatus

The Stewart liberal dealer franchise offers both car and truck dealers an unusual money-making opportunity

Stewart MOTOR TRUCKS

STEWART MOTOR CORPORATION
BUFFALO, N. Y.

Cables: Stewartruk Buffalo.
Codes: Acme, Bentley.

SPECIFICATIONS

MOTOR—8 cylinder truck type bore 3¾", stroke 4¾". Horse power 130. Built-in oil cleaner.

CARBURETOR—Latest Stromberg with accelerator pump, fuel economizer and air cleaner. Swan manifold.

IGNITION—Delco-Remy—direct gear driven. Also Delco-Remy starter with Bendix gear shift.

TRANSMISSION—12 speeds forward, 3 reverse and overdrive. The overdrive permits slow motor speeds on long, fast runs.

STEERING GEAR—Latest Ross roller gear type.

FRAME—Side rails unusual depth of 9".

SPRINGS—Front 40" x 3". Rear 50" x 3", equipped with helper type standard.

REAR AXLE—Timken double reduction type—full floating. Worm optional.

BRAKES — Bendix 4 wheel mechanical, equipped with vacuum booster.

TIRES—9.00-20 all around. Duals rear.

WHEELBASE—170" Standard. At extra cost 196", 226" and 241".

WEIGHT—7625 lbs.

Stewart Trucks have won—By costing less to run

Commercial Car Sales In February About 23,000

(Continued from Page 1)

shire, Rhode Island, South Carolina, Utah, Virginia and the District of Columbia. Arkansas sales were only one unit below a year ago, while the decline was slight in Idaho and Vermont.

Increases in commercial car sales in February over the preceding month were reported by Maryland, New Hampshire, Ohio, Rhode Island, Utah, Vermont, Virginia and the District of Columbia.

Registrations of Ford commercial cars in the reporting states in February amounted to 3,582, as against 4,499 in the same states in February of last year, a decline of 20 per cent. Ford accounted for 46 per cent. of the total sales in those states, as against 43 per cent. a year ago.

Chevrolet registrations in these states in February were 2,650, as compared with 3,584 in February of last year, a falling off of 26 per cent. Chevrolet's share of the total was 34 per cent., the same as in the corresponding states and month last year.

International sales last month were 478, as against 704 a year ago, off 32 per cent., and equivalent to 6.1 per cent. of the total, as against 6.7 per cent. a year ago.

Dodge registrations amounted to 305 in these states, as against 367 a year ago, off 16 per cent., and equivalent to 3.9 per cent. of the total, as compared with 3.5 per cent. in February, 1930.

Following are the new commercial car registrations for the states that have reported for February, as compared with the corresponding month of last year and the preceding month:

	Feb., 1931	Feb., 1930	Jan., 1931
Alabama	201	559	255
Arkansas	267	268	359
Delaware	59	96	70
Florida	389	755	932
Idaho	99	105	182
Illinois	1,439	2,141	2,005
Maryland	298	452	280
Minnesota	296	536	500
Montana	151	231	182
Nebraska	470	619	643
New Hampshire	143	75	32
North Carolina	370	452	563
North Dakota	89	123	98
Ohio	1,021	1,224	980
Oregon	248	331	301
Rhode Island	134	127	88
South Carolina	237	230	315
Utah	156	109	83
Vermont	75	80	60
Virginia	863	816	352
West Virginia	216	267	251
Wisconsin	452	748	654
Dist. of Col.	112	75	100
Totals	7,785	10,419	9,185

U. S. HOLDS ITS LEAD AS TIRE EXPORTER

(Continued from Page 1)

as secondary factors, according to trade opinion.

As a consequence of the depression, it is pointed out, the purchase of automobiles has been curtailed with a consequent reduced consumption of tires. In many cases cars have been withdrawn from use and stored, the owners being unable to maintain their upkeep. Repossession of cars for default of payments has also been apparent in many markets. Furthermore, in the face of difficult times owners have made their tires perform longer service. It is likelise pointed out by trade leaders that present day tires due to improved methods of manufacture are generally giving getter service and that improved roads are also aiding in the prolongation of tire wear.

PHILADELPHIA DEALERS TO ELECT ON MARCH 23

Philadelphia, March 19.—At a meeting of the active members of the Philadelpiha Automobile Trade Association on Monday, March 23, will be held the annual election of officers of that body. On that evening also, the election of officers of the Automotive Service Association will take place.

OPEN 27TH BRANCH

Trenton, N. J., March 19.—The Pep Boys, operators of a chain of automobile accessory and supply stores throughout eastern Pennsylvania, New Jersey and Delaware, opened a branch store at 102 North Broad St. today. The opening of the Trenton store of the Pep Boys makes the twenty-seventh store of this concern.

NEW AUBURN DEALERS ARE WELL FINANCED

(Continued from Page 1)

joined Auburn: The Peterson Motor Company, Boise, Idaho; H. M. Lumley, Huntington Park, Cal.; Boyer Motor Company, Pittsburgh, Pa.; Smith Brothers & Co., Peoria, Ill.; Dohler Brothers, Pittsburgh, Pa.; McClintock Motor Sales, Lansing, Mich.; William H. Nicholas Company, South Bend, Ind., and Bird Motor Company, Atlanta, Ga.

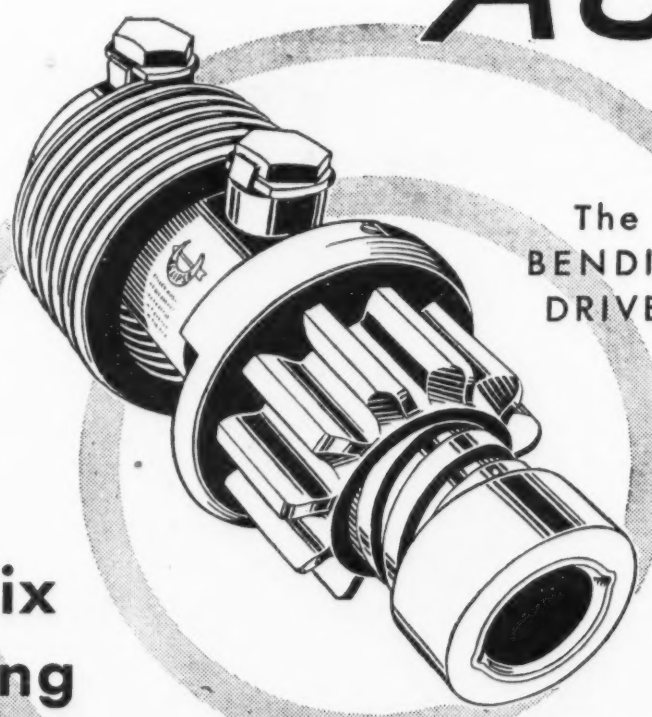
NEW HOBOKEN GARAGE COMPLETELY EQUIPPED

Hoboken, N. J., March 19.—George Zubalsky for many years engaged in the automobile business, has opened the G-Z Service Station at 14th and Bloomfield Streets, Hoboken. This new station represents the latest trend in design and equipment. A driveway leads to the stucco structure which houses the office, stock and rest rooms. The automotive service equipment includes a modern lubrication system. Mechanical tire spreaders and changes and new type flood lighting are among the improvements. A full line of automobile accessories will be handled.

KELLY-SPRINGFIELD NAMES W. H. LALLY PRESIDENT

New York, March 19.—The Kelly-Springfield Tire Company has elected W. H. Lally president to succeed Samuel Woolner, Jr., resigned M. B. Muxen was elected chairman of the board of directors, and J. K. Newman, chairman of the executive committee, which also includes Frank Wilbur Main, W. M. Flook, J. K. Newman, John Hancock and Mr. Muxen. Louis Mueller was elected first vice-president.

Mastery of AUTO



The BENDIX DRIVE

Bendix starting

Like the touch of a magician's wand, you have only to touch a button — and vast power is alive.

You seldom see the Bendix Drive of your starter; but it's there — so faithful, so faultless in performance of its job that you expect that perfection of which it does not fall short.

Automatically it engages the fly-wheel, cranks the motor, releases; and protects your starter from damage in unintentional operation. That is Bendix Starting.

ECLIPSE MACHINE COMPANY · ELMIRA, NEW YORK
ECLIPSE MACHINE COMPANY, *Limited* · WALKERVILLE, ONTARIO
(Divisions of Bendix Aviation Corporation)

BENDIX
Automobile and Aviation
PRODUCTS

Bendix Brakes, Bendix Drive, Eclipse Aircraft Starters and Generators, Stromberg Carburetors, B-K Vacuum Brake Boosters, Aircraft Propellers, Bendix-Westinghouse Air Braking Systems, Marine Instruments, Scintilla Aircraft Magnetos, Pioneer Instruments, Delco Aircraft Ignition, Weather Instruments, Bendix-Cowdrey Brake Testers and other equipment.

BENDIX
AUTOMOBILE

GOVERNMENT TO KEEP CENSUS OF WORLD AUTOMOBILE STOCKS

(Continued from Page 1)

pointed out today by the automotive division of the department.

The reports will be issued at the beginning of each month so as to provide current information concerning foreign marketing conditions

This new service of the department has been developed with the assistance of field officers of the Bureau of Foreign and Domestic Commerce in more than forty countries. These officials maintain close contact with automobile distributors and other agencies associated with the trade in motor vehicles and are in an excellent position to form an estimate of stocks in their respective territories.

They have been instructed to investigate the situation carefully at the end of each month by consulting all available sources of information and cable reports to Washington.

Accurate statistical information is unobtainable in many foreign countries, but a careful estimate by experienced observers is expected to provide a valuable picture of the market.

Monthly estimates of stocks will show for each foreign country whether stocks of passenger cars and trucks (broken down, according to broad price classes and weight categories) and used cars are unusually high, seasonally high, high, normal, low, seasonally low, or unusually low.

Current information of this kind is regarded as of essential value to export departments in connection with their foreign market analyses and export programs.

New Car Sales Up Sharply In Missouri in February

NEW YORK, March 19.—Showing a sharp recovery from the low level of the preceding month, retail sales of new passenger cars in Missouri in February totaled 9,848, as against 1,983 in January, an upturn of 396 per cent.

Sales of new cars in Missouri continued in February to run below the levels of a year ago, however, the total comparing with 14,030 in February of 1930, a decline of 29 per cent. This was the same rate of decline that prevailed in January.

For the first two months of this year new car registrations in Missouri amounted to 11,831, as compared with 16,838 in the corresponding period of last year, a decline of 29 per cent.

A number of cars in February not only made gains over the preceding month but were able to set up increases over the corresponding month of last year. These were Auburn, with 143, against 39; Cadillac, 25 to 16; Cord, 12 to 6; Lincoln, 13 to 11; Marmon, 96 to 61; Plymouth, 198 to 175; Reo, 34 to 40; Whippet, 313 to 264; Willys, 481 to 240.

Cars making gains for the first two months of this year over the corresponding period of last year were: Auburn, 191 to 43; Cadillac, 34 to 21; Cord, 12 to 6; Lincoln, 17 to 16; Marmon, 126 to 80; Plymouth, 249 to 227, and Willys, 506 to 292.

Following are the registrations of new passenger cars in Missouri in February, as compared with the corresponding month of last year and with January, 1931:

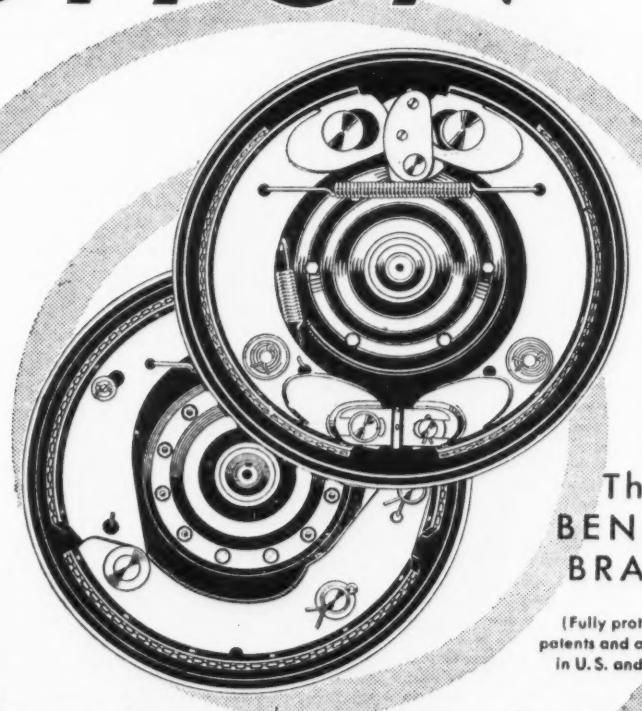
	Feb. 1931	Feb. 1930	Jan. 1931
Auburn	143	39	48
Austin	23	*	3
Buick	355	421	75
Cadillac	24	16	9
Chevrolet	3,485	4,011	772
Chrysler	114	165	22
Cord	12	6	0
De Soto	75	117	20
Dodge	306	310	43
Durant	62	168	6
Essex	199	373	36
Ford	2,498	5,517	538
Franklin	9	25	1
Graham	88	170	26
Hudson	60	124	14
Hupmobile	87	156	31
La Salle	19	50	7
Lincoln	13	11	4
Marmon	96	61	30
Nash	147	191	32
Oakland	65	96	14
Oldsmobile	246	400	29
Packard	68	80	14
Peerless	5	20	5
Pierce-Arrow	22	33	13
Plymouth	198	175	51
Pontiac	384	409	56
Reo	34	30	3
Studebaker	138	143	30
Stutz	3	9	0
Viking	6	11	0
Whippet	313	264	11
Willys	481	240	25
Willys-Knight	49	80	8
Miscellaneous	20	109	7
Totals	9,848	14,030	1,983

Following are the totals for the first two months of this year, as compared with the corresponding period of last:

	1931	1930
Auburn	191	43
Austin	26	*
Buick	430	519
Cadillac	34	21
Chevrolet	4,257	4,790
Chrysler	136	203
Cord	12	6
De Soto	95	145
Dodge	349	369
Durant	68	197
Essex	235	459
Ford	3,036	6,562
Franklin	10	30
Graham	114	207
Hudson	74	146
Hupmobile	118	185
La Salle	26	56
Lincoln	17	16
Marmon	126	80
Nash	179	232
Oakland	79	111
Oldsmobile	275	472
Packard	82	96
Peerless	10	27
Pierce-Arrow	35	44
Plymouth	249	227
Pontiac	440	484
Reo	37	41
Studebaker	163	186
Stutz	3	9
Viking	6	17
Whippet	324	327
Willys	506	292
Willys-Knight	57	93
Miscellaneous	27	145
Totals	11,831	16,838

*—Not on the market at the time.

MOTION



The BENDIX BRAKE

(Fully protected by patents and applications in U.S. and abroad)

Bendix stopping

And again there is magic—when you check your car; stop it—smoothly, safely; mastery of momentum!

Easy foot pressure on your brake pedal creates positive control of the moving vehicle. Servo action—exclusively Bendix—draws that momentum from the car's rotating wheels, and uses it as increased stopping energy; augments light pedal pressure to immense braking power—with strength of steel, with touch of velvet. That is Bendix Stopping.

BENDIX BRAKE COMPANY · SOUTH BEND, INDIANA

(Division of Bendix Aviation Corporation)

PRODUCTS

and AVIATION

Making Coal Deliveries Profitable

G. M. SURVEY BLAMES LOST TIME IN DELIVERY FOR HIGH OVERHEAD

The following survey of the coal delivery field was conducted by the General Motors Truck Company of Pontiac, Mich., with the idea of determining reasons for, and reducing excessive costs in this operation. The results of this survey are appearing serially in Automotive Daily News, through the courtesy of the General Motors Truck Company. The complete text of this report is available at all General Motors Truck Company dealerships.

LITTLE need be said here about the means that dealers are using to speed up loading. Gravity and power type loading devices are familiar to every coal dealer. Whether or not he installs more of them in his yard depends on whether the economies they effect will outweigh the cost of installation. Moreover, the specific type of loading improvement the individual dealer needs is dependent largely on the layout of his yard. Every dealer, however, should bear in mind the profit possibilities from such equipment in getting greater work accomplishment from his trucks. Minutes saved for the trucks mean dollars saved for the dealer—and it takes relatively little time saving, when multiplied by several trucks, to return the investment in loading equipment.

Simplifying Dispatch Procedure

The practice of having drivers stop and enter the dispatch and scale room twice, once to get loading instructions and again to get tickets and delivery instructions, is almost universal in all yards. And yet it is perhaps the greatest source of time loss at the yard. For, in addition to the actual time involved in two trips to the office for the driver, it is in the office that the driver almost invariably idles time away in mere talk with other workers. Drivers cannot be kept from talking to each other, nor is it necessary to stop them. But when the "office conference" means that scales are blocked and yard traffic stopped, the practice becomes expensive and wasteful. One dealer's loss of time in one day, from that one source alone, was estimated by an investigator to be fifty-five minutes. And that was on a busy day when drivers knew that orders should be rushed.

During the investigation several yards were observed which had cut down office contact for the drivers to a minimum, without reducing the accuracy of loading and delivery instructions. Here are some typical examples:

One dealer, who had had trouble with drivers crowding into the scale room, provided a row of boxes—one for each truck—with openings inside and outside the office. Tickets were placed in the boxes before trucks returned, and drivers took tickets from the boxes outside when they entered the yard.

Several dealers provided small openings through which loading instructions could be shouted to drivers as they entered the yard. One dealer provided this opening with a megaphone, another with a voice magnifier. Thus, one stop was eliminated.

Still another dealer installed a homemade signal system in which lights flashed to show 6 types of coal, 4 grades, and a scale of ½ to 7 tons. When a truck entered the yard, the proper type, grade, and tonnage were flashed to the driver without his having to leave the truck.

In several large yards telephone or messenger boy connections between the dispatch office and the yard foreman or drivers reduced the number of stops at the office, and saved time not only for drivers and foremen but also for the office men.

Whether any of these solutions fit the needs of any individual dealer, depends somewhat on individual circumstances. But in no yard where time was wasted in giving instructions was it found impossible to reduce that time—and usually it could be reduced by some simple, commonsense method.

Reducing Delays at the Point of Delivery

MOST dealers, of course, have weighed the value of using helpers or shovelers to release truck equipment when the load must be wheeled in or carried in at the point of delivery. Whether or not helpers are an economy will depend largely on three factors: (1) Local customer acceptance of an extra charge for wheeling or carrying in; (2) local laws or building habits necessitating a large number of wheel-ins or carry-ins, and (3) union restrictions on drivers.

But using helpers to store coal after it is dumped will not remove many of the most costly delays at the point of delivery. In general, the other delays encountered group themselves into two main classes:

Delays caused by physical circumstances, such as the customer's receiving facilities or impassable roads.

Delays caused by the customer, such as absence from home, insufficient cash, or complaints on the delivery.

During the investigation on which this report is based, scores of delays were observed that could be attributed to these two causes. And in many cases, study of the dealer's methods revealed that he made little or no attempt to overcome these sources of lost time. Some dealers were found, however, who had established effective control. In general, this control included two definite methods:

1. A carefully developed order-taking procedure.
2. Complete customer record systems which indicate all the essential physical characteristics of the delivery.

Checking Delivery as Orders Come In

Usually, the best way to control delays at the point of delivery is to check the order as it comes in. If solicitors or salesmen bring in new business they should check thoroughly the receiving facilities on the customer's premises and record all the necessary data on the order blank **before it is turned in.** When orders come in over the phone, the order clerk should have a definite procedure for making the same sort of check-up, so that when he fills out the final order he can note any difficulties that might be encountered in delivery.

The best system for getting this information quickly and easily, without annoyance to the customer, was found in an office in a Western city, where one person is assigned to take all orders, so that he becomes familiar with all regular accounts. In his office, directly in front of him, is a map of the city, with certain areas marked off by red and blue lines. The areas inclosed in red lines are sections where bad streets are likely to be encountered. The blue areas are those with narrow streets and alleys, where deliveries must be made with small trucks. Beside him is a file containing complete customer record cards. Thus, he has at hand all the useful information he has accumulated.

"I recognize the names of about 70 per cent. of the customers who call," says this order clerk. "And I know I can get complete delivery information on those people from my file, which I have built up. So I don't have to ask them questions. But when I don't recognize a name, I ask if they have ever received coal from us. If they say 'yes,' I know I have a record of them. If they say 'no,' I go on to ask about the receiving facilities. Then I note the address; if it falls in a red or blue area, I ask about the condition of the streets.

"I always ask each customer if some one will be there to receive the coal at the time it is likely to be delivered. That helps to make sure some one will be home and enables us to adjust our delivery to the customer's convenience, if necessary. I have our price list in front of me, too, and, if the order is C. O. D., I state the price and ask the customer to have the amount on hand."

Questions of this kind, far from annoying the average customer, will impress him with the care the dealer is taking to give satisfactory delivery. And if the information gained by such a check-up is carefully recorded on each delivery ticket it will enable the dealer to reduce, in a large measure, the losses of time which ordinarily occur at the point of delivery.

Reducing Lost Time in the Shop

MOTOR truck engineers have gone a long way in the past ten or fifteen years toward building trucks that will stand up and run, even under severe abuse. But any piece of machinery needs care; and even with the best of care, troubles will develop at some time or other.

The point every coal dealer should bear in mind is that proper care and maintenance will reduce the need for repairs to a minimum.

Trucks are designed to do certain work and to carry certain loads—with a wide margin of safety. If major breakdowns and troubles occur, therefore, the chances are that the truck is being abused, either through carelessness or through an effort to make it do more work than it is designed to do. Broken axles, clutch breakdowns, spring breakage, bent or broken frames, bearing failure and excessive wear of moving parts—all these point to improper care. With proper care, a truck should need major repairs only when normal wear from thousands of miles of service makes such repairs necessary.

Judging by this standard, study of the repair records of hundreds of coal trucks shows abundant evidence of abuse and improper maintenance—far more than the average in other industries. And the cost of these repairs is staggering. It is a three-way cost:

1. Cost of labor and parts.
2. Cost of hours of idle time.
3. Cost of loss of service to your customers.

All these facts point to the need for greater watchfulness. Too many dealers are content to assume that repairs are an inevitable part of the grief of truck operation, instead of aggressively setting out to reduce repairs to the minimum.

Prevent Truck Abuse

It is not the dealer himself who abuses his trucks, although he often does countenance heavy overloads. It is usually the driver's carelessness or recklessness that brings about the need for major repairs. Here is a typical instance reported by an investigator in the East:

"I found two trucks in this fleet, each of which had had three axle shafts broken in the past four months. Both were heavy duty trucks of the same make, and Mr. ——— (the owner) blamed the manufacturer severely. I investigated and found some very interesting facts in each case.

"One truck delivered fifty tons of steam coal to a manufacturing plant a mile away each day throughout the year. The run was short and over good streets, and I was about to conclude that Mr. —— was right in condemning the manufacturer. Then the truck swung in to dump into a coal hole alongside the manufacturer's power house. Back up over a curb it went, load and all, at top speed in reverse. I questioned the driver and found that the same procedure was carried out ten times each day. Two blocks of wook, cut at an angle, would have saved this dealer many dollars of lost time and repair expense.

"The other truck had to deliver seventy-five tons a day to another plant about two miles away. It couldn't be done without putting side-boards on and loading up seven tons on a five-ton truck. And ten to twelve times a day that truck traveled two miles with a heavy overload. But the worst part was that the driver, rather than shifting to get over a raised rail crossing on the route, stepped on the gas, hit the crossing at about twenty miles an hour, and slid down the other side. The crossing was rough—no wonder the axles were strained."

Such instances of gross abuse were found frequently. They are the rule, rather than the exception. And the surest way to prevent this costly abuse is to develop a sound, simple method of scheduling maintenance and controlling overloading.

(To Be Continued)

Uses Own Newspaper in Advertising

WEATHER This is the ideal time to buy a Pedigreed Used Car.

Buick Motorists' News

GMAC Time Payments Are the Lowest

VOL. I, No. 1 MAIN OFFICE 870 Bergen Ave. Jersey City, N. J. SATURDAY, MARCH 14, 1931 PRICE 5 CENTS

RUSH ON FOR USED CARS

SPRING SHOWING
—of—
PEDIGREED USED CARS

30-Day Guarantee Backs Each Car Sold

Crowds of Hudson County motorists are rushing here every day to see these remarkable used cars. They're all in excellent shape and tagged with prices which mean quick clearance. WE URGE YOU TO ACT QUICKLY. Delay may mean the loss of the car of your dreams!

We Make a Friend When We Sell You a Car

75 CARS—Priced From $100 Up

1928 BUICK *5-Passenger Sedan Series 116*
This car has been re-conditioned by our experts and will give you many miles of pleasant driving. Priced at..... $725

1929 OLDSMOBILE COUPE *De Luxe Equipment*
This car is a real bargain at this price. See it today. Only..... $495

1929 CHRYSLER *Sport Roadster*
A racy model with plenty of pep and power. In wonderful condition. A real buy at..... $725

1928 STUDEBAKER COMMANDER *5-Passenger Sedan*
Just the car for the family. Everything in good shape and priced for quick clearance..... $495

1929 BUICK *Master Sedan*
A beautiful car—in excellent condition. Must be seen to be appreciated. Price..... $975

1929 FORD *2-Passenger Coupe*
Here is wonderful value for almost a give-away price..... $175

1929 DODGE *5-Passenger Sedan "De Luxe Model"*
New car value at used car price. See this car today and be convinced..... $595

1928 AUBURN *Convertible Coupe*
This is a dandy. Has 2 extra wheels and tires at..... $550

1928 PONTIAC *5-Passenger Sedan*
A light, serviceable car—economical to run and a bargain at..... $295

1929 NASH *5-Passenger Sedan*
This is just the car you have been looking for. Paint, tires, upholstery — all as good condition. Only..... $695

USED CAR DEPARTMENT

HUDSON COUNTY BUICK COMPANY

914 Montgomery St. (Near Westside Ave.) JERSEY CITY, N. J.

870 Bergen Ave. JERSEY CITY, N. J. Phone—DElaware 3-6900

4561 Hudson Boulevard NORTH BERGEN N. J. Telephone—PAlisade 6-0900

UNUSUAL VALUE IS OFFERED BY BUICK COMPANY

Throngs Visit Three Displays in Jersey City—'Every Sale Makes a Friend,' Motto.

PRICES AMAZE BUYERS, EVERY CAR A BARGAIN

Spring weather is with us, and with it comes the urge to be out in the open air away from the cares of everyday. Relief from the humdrums of the day is offered by the used car department of the Hudson County Buick Company, which is now staging its annual Spring Showing of used cars at prices cut to the bone.

On display at the three showrooms are over 75 models of cars in all classes and in prices ranging from $100 to $1,200, each covered by a thirty-day guarantee, and financed under the GMAC time payment plan, which offers the lowest rates obtainable.

The three used car departments are located at 870 Bergen avenue, Jersey City; 4561 Hudson Boulevard, North Bergen, and the Opel Air Display at 914 Montgomery Street, Jersey City near Westside avenue.

Almost anyone can make a sale—but only the merchant who deals fairly and squarely can make a friend. And such a concern is the Hudson County Buick Company. Judging by the number of used cars they have sold, their friends in Northern New Jersey are legion.

You will be amazed to see the wonderful values which are being featured at the three showrooms exhibiting the Spring specials. The Hudson County Buick Company is well-known to local residents for its honest values, and the fact that all of the cars sold have been PEDIGREED used cars, throughly reconditioned, and unquestionably the best buys obtainable in the used car field.

Motorists desirous of securing a used car at an absolute sacrifice are urged to see the cars at the Hudson County Buick Company's three showrooms. The men at these places will be glad to show you around, and explain full details of each and every special.

If desired, a free demonstration will be arranged at any time desired, and the prospect's family can be taken along, to any place, and at any time. There are no red strings attached to this offer, and the prospect is the sole and final judge in the matter.

Opportunity knocks but once at your door, an old proverb avers, and that is so in this Spring Showing of Used Cars. An early visit will insure an excellent selection of a used pedigreed car sure to please your fancy and pocketbook. A word to the wise is sufficient. Come EARLY.

As a final word of advice to the prospective purchaser of a used car, be sure to bring a friend with you who knows cars and then you will feel satisfied that Hudson County Buick Company's by-word, "Every sales makes a friend," is true.

Ideal days of Spring weather are here, forecasting an early Summer. It is easy to picture yourself in one of these shiny re-conditioned cars speeding on to the seashore, or to the farm, or high up in the shady nooks of the beckoning mountains. Out in the open—thrilling to the life of a new-born season. That's what awaits you in the car you'll buy at Hudson County Buick Company's used car department.

THE HUDSON COUNTY BUICK COMPANY, with showrooms in Jersey City and North Bergen, in New Jersey, used the above unique ad to advertise its spring showing of used cars

New Truck Sales in Cook County Off in February

CHICAGO, March 19.—New truck registrations in Cook county for February were 36.9 per cent. in arrears of those for January this year and showed a decline of 34.3 per cent. from February a year ago. Total listings for last month were 553, as compared with 877 the preceding month and 842 in February, 1930.

Decreases among the popular selling makes were marked. Ford had 286, as against 395 in January and 328 in February last year. Chevrolet had 77 last month, 144 in January and 116 for February, 1930.

International Harvester was credited with 42 last month and had 67 in January and 85 in February last year. Diamond T, with a substantial list of orders on hand for the new low priced truck introduced at show time, registered 28 trucks last month. It is announced that deliveries will start within a few weeks on the new Diamond T offering.

Fifth place in the general standing went to Dodge with 25 as against 30 in January and 34 for February, 1930. Then came GMC with 15 which was a gain of six trucks over January and one behind the registrations of February, 1930.

Reo had a gain of two trucks over February last year, registering 11. This compared with 3 for the opening month this year.

Autocar also led last year, having 10 listings. In January Autocar registered 5 and in February last year 3. Mack led January by two trucks, having a total of 7, but lost an equal number compared with February a year ago.

A review of February registrations for five years shows the following: February, 1931, 553; 1930, 842; 1929, 1,153; 1928, 781, and 1927, 863.

Following is the record for February this year compared with January, 1931, and February, 1930:

	Feb., 1931.	Jan., 1931.	Feb., 1930.
Ford	286	395	328
Chevrolet	77	144	116
International	42	67	85
Diamond-T	28	77	72
Dodge	25	30	34
GMC	15	9	16
Reo	11	3	9
Autocar	10	5	8
Nelson Le Moon	8	14	14
Chicago	8	8	10
Mack	7	5	14
Available	6	8	19
Stewart	5	10	4
Indiana	4	16	6
Federal	3	3	10
White	2	19	14
Studebaker	2	0	3
Hendrickson	2	8	6
Rieland & Bree	2	4	3
Willys	2	3	2
Walker	1	2	0
Sterling	1	0	9
Acorn	1	1	0
King Zeitler	1	2	4
Yellow Coach	1	0	2
Miscellaneous	4	17	54

CLASSIFIED ADVERTISEMENTS IN THE AUTOMOTIVE DAILY NEWS BRING RESULTS

WILLYS-OVERLAND HAS NET LOSS FOR 1930

New York, March 19.—Report of the Willys-Overland Company and subsidiaries for the year ended December 31, 1930, shows net loss of $7,588,392 after depreciation, inventory adjustments, interest, shrinkage in book value of common shares in controlled and other companies and after provision for possible losses on non-current models and obsolete materials.

The 1930 earnings include refund of $902,567 Federal income tax paid in prior years and credit adjustment of prior years' reserves and expenses amounting to $582,686. In 1929 net loss was $4,979,857 after depreciation, inventory adjustments, interest, and after deducting $5,494,693 for special amortization of tools, dies, etc., provision for losses on miscellaneous notes and accounts receivable, price reductions and allowances.

L. A. Miller, president, said in his report to stockholders:—

"Car sales for the year were 80,555, the volume being seriously affected principally by the business depression, but also by the curtailment of our four-cylinder production in anticipation of our new 1931 line, which embraces only sixes and eights.

"During 1930 the company made sacrifices to protect its distributor and dealer accounts through a difficult period, thereby placing them in a strategic position to take advantage of the new 1931 models and the improvement in general business.

"All expenses incident to engineering and development of the new models have been written off. As of this date all past models have been sold, placing the company in a most advantageous position for the current year.

"During the year drastic economies have been effected and improved processes installed. Our productive capacity has not been greatly curtailed, but all operations have been so changed that in the event of a correspondingly small volume in any subsequent year the company will be able to obtain satisfactory results."

OTHER FINANCIAL NEWS

MOTOR PRODUCTS CORP.

Report of the Motor Products Corporation for the year ended December 31, 1930, shows net profit of $487,139, after depreciation, Federal taxes, etc., equivalent to $2.47 a share on 197,366 no-par shares of capital stock. This compares with $2,140,847, equal, after dividends on the $5 preferred stock, to $10.42 a share on the common in 1929. The preferred stock was retired May 18, 1929.

COURT MOTORS WILL DISTRIBUTE NASH

Duluth, Minn., March 19.—Court Motors, a new retail automobile dealer, has opened for business at 524 West 1st St., in Duluth, with George H. Cole as manager. This company has been appointed Nash distributor for Duluth, Sioquet, Two Harbors and surrounding territory.

PLAN $40,000 GARAGE

Passaic, N. J., March 19.—The Board of Adjustment has approved the application of Kreuger Brothers of 537 Franklin Ave., Nutley, to erect a $40,000 public garage at 1-3 Main Ave.

Experience is continually pointing out the low operating expense of Wisconsin Axles.

WISCONSIN AXLE CO.
Oshkosh Wisconsin

Cumulative New Commercial Car Registration Statistics, February, 1931

Figures in this table are from R. L. Polk & Co. of Detroit, with the exception of Illinois, which are supplied by the Robinson Advertising Service, Springfield, Ill., and New Jersey, which are furnished by the New Jersey Motor List Co., New Car Division, Trenton, N. J. Some of this data has been published previously, but it is given here complete for the convenience of our subscribers. Commercial car registrations do not include busses.

Returns for today: Arkansas and Minnesota

States	Autocar	Brockway-Indiana	Chevrolet	Diamond-T	Dodge	Essex	FWD	Fargo	Federal	Ford	G. M. C.	International	Mack	Paige	Relay	Reo	Republic	Rugby	Sterling	Stewart	Studebaker	Whippet	White	Willys	Willys-Knight	Miscellaneous	Totals	States
Alabama		4	97		2					83	1	11				1					1			1			201	Alabama
Arkansas			89		4					153		5	15			1											267	Arkansas
Delaware			24		1					30	2		1							1							59	Delaware
Florida		1	124		6					242	2	4				3							4			3	389	Florida
Idaho			36		4		1			51	2	3											1			1	99	Idaho
Illinois	10	5	382	36	70			1	9	646	23	142	11			18	1		2	5	13	4	2	13	1	45	1439	Illinois
Maryland		2	88	6	5				8	138	6	13	7			8				1	4	1	6	2		3	298	Maryland
Minn.			101		16		2		2	127	2	23			2	3	3	2			4	1	4	1	2	1	296	Minn.
Montana			53		5			1		64	1	21				1	1	1		1				1		1	151	Montana
Nebraska			181	3	25			1		181	8	48	1			3				1	7		3	7		1	470	Nebraska
N. Hamp.			49	1	3				3	71	1	6				3				2	3		1				143	New Hamp
Nor. Car.			180		23					138	3	16	1								2		1	1		5	370	Nor. Car.
Nor. Dak.			35		5			1		30	1	17															89	Nor. Dak.
Ohio	1	6	277	3	46			6	2	497	22	57	4		1	8		5	2	4	36		16	13		15	1021	Ohio
Oregon	2		66		4		1		1	132	3	9	5				6		1		5		6			7	248	Oregon
Rho. Isl.	2		24		7				8	74	2	3	1			6					5		1	1			134	Rho. Isl.
S. Car.		1	114		8					99	1	10	1			1							1			1	237	S. Carolina
Utah			49		4					70	7	13	1			5					1		3			3	156	Utah
Vermont			19		4					37	3	9				1					1			1			75	Vermont
Virginia	2	1	395		32	1			1	369	11	30			3	3	2	1		1	3		6	2			863	Virginia
W. Va.	5	1	66		19	1				101	6	10				1					2		1	2		1	216	W. Virginia
Wisconsin			179	2	11		6	1	3	183	13	25	1			1			4	1	10	1		6		5	452	Wisconsin
Dist. of C.	4		22	3	1		1			66	5	3	1		1				1				1			3	112	Dis. of Col.
Totals	26	21	2650	54	305	4	9	11	37	3582	125	478	50		7	67	13	9	10	17	97	7	57	51	3	95	7785	Totals
Ala., 1930			280		7			1		228	6	18	6			2					2	1	6	1		1	559	Ala., 1930
Ark., 1930		1	101		10				1	126		25									1	1		2			268	Ark., 1930
Del., 1930	3	3	37		2					39	1	3	1			5										2	96	Del., 1930
Fla., 1930		10	253		19	2			3	393	6	31	5			12		1				8	8	1		3	755	Fla., 1930
Idaho, '30	1		36		4					52	2	3				4		1				1	1				105	Idaho, '30
Ill., 1930	10	12	676	87	88	1		21	20	747	21	217	16			35	4	3	10	4		29	16		3	121	2141	Ill., 1930
Md. ,1930	12	5	139	3	11	1		1	3	212	3	17	3			8	2		1	3	1	1	8	2		16	452	Md., 1930
Minn., '30		3	122	1	22	1		2	8	279	10	47	4		1	12	1	2			2	7	5	6		1	536	Minn., '30
Mont., '30			57		9			1		117	6	37	1			1					1	1					231	Mont., '30
Neb., 1930			252	1	18			2	1	254	12	52	4			9					1	4		5	1	3	619	Neb., 1930
N. H., '30		3	23		6				1	35		3				1				1					1	1	75	N. H., '30
N. C., '30	2		201		15	1		1		196	6	17	2			1		2				3	1	2	1	1	452	N. C., 1930
N. D., '30			38		2			2		41	1	29				4					1	2		2			123	N. D., 1930
Ohio, '30	18	4	350		52	6		4	3	557	15	73	5		2	30	1	4		8	4	16	35	5	3	29	1224	Ohio, 1930
Ore., '30		1	78		21			2	5	170	6	13	8			6	2	3	1		2	2	3		1	7	331	Ore., 1930
R. I., '30	8	1	27		9				1	58	4	5	3			6							4			1	127	R. I., 1930
S. C., '30			101		2	1		2	1	107	1	10	1				1	2					1				230	S. C., 1930
Utah, '30			27		3					59	1	11	2			5							1				109	Utah, 1930
Vt., 1930		1	27		4				1	35	2	3				2						4	1				80	Vt., 1930
Va., 1930		5	377		20			1	3	318	9	36				9	2	1		3		2	4	9	5	12	816	Va., 1930
W. V., '30			90	1	14			2	1	123	7	11				7	1				2	3	3			2	267	W. V., '30
Wis., '30		1	277	6	26			5	4	310	14	42	1			16	1	2	8	4	3	4	1	7		16	748	Wis., 1930
D. C., '30	1		15		3					43	4	1	1						1	1			2			3	75	D. C., 1930
Totals	55	50	3584	99	367	13	*	47	56	4499	137	704	63	*	3	175	15	21	21	24	20	89	100	43	15	219	10419	Totals

*Carried in the Miscellaneous Column.

IN THE ACCESSORY AND SERVICE FIELD

F. C. BREYER PROMOTED

Fargo, N. D., March 19.—Ferdinand C. Breyer, retail manager for the Goodrich Tire Company in Fargo, has been promoted to branch manager in charge of wholesale distribution. He will continue in charge of retail sales with offices at 312 1st Ave., North. Wholesale territory served from Fargo offices includes North Dakota, eastern Montana and the north half of South Dakota and a portion of western Minnesota.

NEW ACCESSORY BRANCH

Jersey City, N. J., March 19.—The Comet Auto Stores, Inc., announces the opening of its fourth branch in Hudson county. The newest branch will be at 449 Central Ave.

GETS GOODRICH AWARD

Newark, N. J., March 19.—J. E. Duffy of the Newark branch of the B. F. Goodrich Rubber Company is among Goodrich employees who shared awards this month for creative suggestions concerning the operation of Silvertown stores. The Goodrich Corporation makes similar awards monthly to all employees who devise better means of accomplishing some factory, branch or store operation.

GETS GENERAL FRANCHISE

Ilion, N. Y., March 19.—The franchise for the exclusive distribution of General tires in Ilion and vicinity by the General Tire and Rubber Company has been granted to the Best Garage, of which Alexander Reardon is manager. Tom Bissett will have charge of the General Tire sales for the company.

SERVICE STATION EXPANDS

North Bergen, N. J., March 19.—Karel Brothers' one-stop station at Hudson Boulevard and Bergline Avenue has been renovated, enlarged and fully equipped to give complete service to all motorists. "These alterations enlarging our station," said Joseph Karel, "were made to take care of our increasing private automobile business. We have always had the Boulevard buses for servicing here, and the added business is from individual owners."

FORMS NEW CONCERN

San Antonio, Tex., March 19.—W. P. Bates, formerly president of the Reo Motor Car Company of Texas, has formed the W. P. Bates Company Inc., to serve as distributor for all of south Texas and northern Mexico for the Duncombe free wheeling device for Ford cars. Headquarters have been established at 823 Roosevelt Ave., this city, and a branch will be opened in Houston within a short time.

NEW TIRE CONCERN

Norwalk, Conn., March 19.—Incorporation papers have been filed for the Norwalk-Currie Tire Company, listing capital stock of $50,000, all paid in. Incorporators are Lenox J. Currie, Richard J. Millburn and Elizabeth Singewald.

NEW BOSCH STATIONS, DISTRIBUTORS NAMED

New York, March 19.—The United American Bosch Corporation announces the following appointments:—

Robert Bosch stations: McKeesport Exide Service, 610-612 Market St., McKeesport, Pa.; Electric Power Maintenance Company, 26 17th St., Toledo, O.

Robert Bosch, technical and commercial distributors: Jacksonville Electric Garage, 625 Hogan St., Jacksonville, Fla.; J. A. Hagenloch, Van Dam and Bradley Avenues, Long Island City.

HUPMOBILE DISTRIBUTOR IN NEW HEADQUARTERS

Syracuse, N. Y., March 19.—W. E. Ferris, Hupmobile distributor, for many years located in Erie Boulevard, has removed his salesrooms and service station to a recently completed building at 1501 South Salina St., in the heart of Syracuse's automobile row. The new plant is complete, and facilities have been provided for everything in the way of service and convenience.

Major Specifications and Mechanical Details of 1931 Commercial Cars

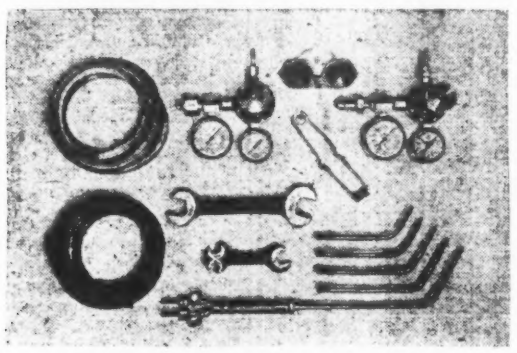
Make and Model	Capacity—Tons or Lbs.	Chassis Price	Engine	No. of Cyls.	Bore and Stroke	Tax H. P.	Max. Brake H. P. at Specified R. P. M.	Oil System	Carburetor	Fuel Feed	Ignit. System	Gear Set	Location	No. Spds. For	Rear Axle	Final Drive	Reduction in Low	Brakes, Foot		Brakes, Hand		Standard Wheel Base	Chassis Weight	Standard Tire Sizes Front	Rear
*Am La France Chief	2½	3650	Own	6	3¾x5	33.7	65@2100	Pw	Str	Vac	DR	Own	C	4	Tim	Wo	31.2	4	D	156		6200	32x6	32x8D
*Am. La Fr. Chieft'n	3-4	5500	Own	8	4½x5½	40.8	75@1800	Pw	Zen	Vac	DR	Own	C	4	Tim	Wo	28.8	4	D	175		7200	S36x8	36x8D
Am. La Fr. Big Chief	6	6725	Own	8	4½x6	48.6	50@1200	Pw	Zen	Vac	DR	Own	C	4	Own	2R	32.8	4W	D	228		10600	S40x8	S40x8D
Austin	—	475	Own	4	2.2x3	7.8	———	CS	Til	—	Aut	W-G	U	3	Sal	Sp	—	4	4	75		———	3.75x18	3.75x18
Autocar A	1½-2	3200	Own	6	4 x4¾	38.4	82@2400	Pw	Str	Vac	DR	Br-L 51	U	4	Own	Sp	27.9	4V	R	150		5060	34x7	34x7
Autocar D	2-2½	3500	Own	6	4 x4¾	38.4	82@2400	Pw	Str	Vac	DR	Br-L 51	U	4	Own	2R	33.5	4V	R	150		5300	34x7	34x7D
*Autocar SH	2½-3	4300	Own	6	4½x4¾	43.4	92@2400	Pw	Str	Gra	DR	Own T	U	4	Own	2R	44.0	RV	R	114		6770	34x7	34x7D
Autocar SCH	2½-3	4300	Own	6	4½x4¾	43.4	92@2400	Pw	Str	Vac	DR	Own T	U	4	Own	2R	44.0	RV	D	157		6860	34x7	34x7D
*Autocar H	3	4100	Own	4	4½x5½	32.4	45@1450	CS	Str	Gra	DR	Own T	U	4	Own	2R	48.6	RV	R	114		6770	34x7	34x7D
*Autocar HS	3½	4600	Own	4	4½x5½	32.4	45@1450	CS	Str	Gra	DR	Own T	U	4	Own	2R	54.3	RV	R	114		7900	40x8	40x8D
*Autocar SHS	3-3½	4800	Own	6	4¼x4¾	43.4	92@2400	Pw	Str	Gra	DR	Own T	U	4	Own	2R	54.3	RV	R	114		7900	40x8	40x8D
*Autocar SCHS	3-3½	4800	Own	6	4¼x4¾	43.4	92@2400	Pw	Str	Vac	DR	Own T	U	4	Own	2R	54.3	RV	D	157		8180	40x8	40x8D
Autocar TEA	3-3½	5350	Own	6	4¼x4¾	43.4	92@2400	Pw	Str	Vac	DR	Own T	U	12	Own	2R	101.1	4V	D	192		8900	36x8	36x8D
Autocar TFA	3½-5	6100	Own	6	4½x4¾	48.6	101@2400	Pw	Str	Vac	DR	Own T	U	12	Own	2R	101.3	4V	D	192		9300	38x9	38x9D
Autocar C	3½-5	5500	Own	6	4½x4¾	48.6	101@2400	Pw	Str	Vac	DR	Own B	C	4	Own	2R	61.7	RV	D	172		9500	42x9	42x9D
Autocar CG	5	8250	Own	6	4½x4¾	48.6	101@2400	Pw	Str	Vac	DR	Own B	C	12	Tim	Wo	120	WB	D	196		13000	36x8	36x8B
Autocar F	7½	6800	Own	6	4½x4¾	48.6	101@2400	Pw	Str	Vac	DR	Br-L 70	C	7	Tim	Wo	94.0	4V	D	173		11000	36x7S	40x8DS
Autocar G	10	9000	Own	6	4½x4¾	48.6	101@2400	Pw	Str	Vac	DR	Br-L 70	C	7	Tim	Wo	100	WB	D	171		13000	36x8	36x8D
Brockway 60	*6000	995	Con	6	3⅜x4	27.3	61@3000	Pb	Zen	P	Aut	W-G	U	3	Col	Sp	19.8	4	Tr	132		3200	30x5	30x5
Brockway 65	6500	1195	Con	6	3⅜x4⅝	27.3	65@2700	Pb	Zen	Vac	Aut	Br-L	U	3	Col	Sp	21.3	4	Tr	137		3400	30x5	30x5
Brockway 75	7500	1290	Con	6	3⅜x4⅝	27.3	65@2700	Pb	Zen	Vac	Aut	Br-L	U	4	Col	Sp	25.6	4	Tr	137		3450	32x6	32x6
Brockway 90	9000	1525	Con	6	3⅜x4⅝	27.3	65@2700	Pb	Zen	Vac	Aut	Br-L	U	4	Col	Sp	20.9	4	Tr	149		3650	32x6	32x6
Brockway 130	12000	1990	Con	6	4 x4½	38.4	73@2400	Pb	Zen	P	Aut	Br-L	U	4	Tim	Sp	31.3	4H	Tr	156		5200	32x6	32x6D
Brockway 140	14000	2495	Con	6	4 x4½	38.4	73@2400	Pb	Zen	P	Aut	Br-L	U	4	Wis	2R	35.3	4HV	D	156		5500	32x6	32x6D
Brockway 141	17000	2935	Con	6	4 x4½	38.4	73@2400	Pb	Zen	P	Aut	Br-L	U	4	Wis	2R	46.2	4HV	D	170		6200	32x6	32x6D
Brockway 170	17000	3160	Con	6	4½x4¾	40.8	89@2400	Pb	Zen	P	Aut	Br-L	U	4	Wis	2R	46.6	4HV	D	170		6800	32x6	32x6D
Brockway 175	17500	3660	Con	6	4⅜x4¾	45.9	100@2400	Pb	Zen	P	Aut	—	U	5	Wis	2R	45.3	4HV	D	170		7200	34x7	34x7D
Brockway 195	19500	3820	Con	6	4½x4¾	40.8	89@2400	Pb	Zen	P	Aut	Br-L	U	4	Wis	2R	49.5	4HV	D	170		7500	34x7	34x7D
Brockway 190	19000	4185	Con	6	4½x4¾	40.8	89@2400	Pb	Zen	P	Aut	Br-L	C	7	Tim	Wo	78.6	RV	D	168½		7625	34x7	34x7D
Brockway 220	22000	4560	Con	6	4⅜x4¾	45.9	100@2400	Pb	Zen	P	Aut	Br-L	U	4	Wis	2R	50.7	4HV	D	170		8200	36x8	36x8D
Brockway 250	25000	5950	Con	6	4⅜x4¾	45.9	100@2400	Pb	Zen	P	Aut	Br-L	U	4	Tim	Wo	63.7	4Hmv	D	182		10000	40x8	40x8D
Brockway 290	30000	7250	Con	6	4¾x5¾	54.15	116@1800	Pw	Str	P	L-N	Br-L	C	7	Tim	Wo	95.0	4W	D	182		10750	38x7P	40x14S
*Brockway 640	40000	9700	Con	6	4¾x5¾	54.15	116@1800	Pw	Str	P	L-N	Br-L	C	7	Tim	Wo	99.9	4W	D	212		14000	38x7P	36x10S
Chevrolet	½	355	Own	6	3⅛x3¾	26.3	50@2600	CS	Car	P	DR	Own	U	3	Own	Sp	13.61	4	R	109		1880	4.75x19	4.75x19
Chevrolet	1½	590	Own	6	3⅛x3¾	26.3	50@2600	CS	Car	P	DR	Own	U	4	Own	Sp	33.46	4	R	157		2890	30x5	30x5D
Chevrolet	1½	520	Own	6	3⅛x3¾	26.3	50@2600	CS	Car	P	DR	Own	U	4	Own	Sp	33.46	4	R	131		2560	30x5	32x6
Commerce Series S 11	1	1600	Bud H S 6	6	3⅜x4½	27.3	52@2200	Pb	Zen	Vac	Aut	Br-L	U	4	Col	Sp	25.5	4	D	142		3900	P30x5	P30x5
Commerce Series S 11	1½	1900	Bud H S 6	6	3⅜x4½	27.3	52@2200	Pb	Zen	Vac	Aut	Br-L	U	4	Tim	Sp	29.2	4	D	162		4300	P30x5	DP30x5
Commerce Series 40	1½	2990	Bud D S 6	6	3⅝x5	31.5	56@2000	Pb	Zen	Vac	Aut	Br-L	U	4	Tim	Wo	34.8	4	D	168		4700	P34x5	DP34x5
Commerce Series S 11	2	2030	Bud H S 6	6	3⅜x4½	27.3	52@2200	Pb	Zen	Vac	Aut	Br-L	U	4	Tim	Sp	29.2	4	D	162		4500	32x6P	32x6D
Commerce Series 40	2	3240	Bud D S 6	6	3⅝x5	31.5	56@2000	Pb	Zen	Vac	Aut	Br-L	U	4	Tim	Wo	34.8	4	D	168		4900	32x6	36x6D
Commerce Series 40	2½	3240	Bud D S 6	6	3⅝x5	31.5	56@2000	Pb	Zen	Vac	Aut	Br-L	U	4	Tim	Wo	34.8	4	D	168		5100	36x6P	36x6D
Commerce Series 60	2½	4580	Bud B A 6	6	4⅛x5½	40.8	83@2100	Pb	Zen	Vac	Aut	Ful	U	5	Tim	Wo	63.0	4	D	175		7000	36x6P	36x6D
Commerce Series 60	3	4680	Bud B A 6	6	4⅛x5½	40.8	83@2100	Pb	Zen	Vac	Aut	Ful	U	5	Tim	Wo	63.0	4	D	175		7100	36x6P	38x7D
Commerce Series 80	3½	5250	Bud B A 6	6	4⅛x5½	40.8	83@2100	Pb	Zen	Vac	Aut	Br-L	C	7	Tim	Wo	98.2	B	D	175		8200	S36x12	36x12S
Commerce Series 80	4	5330	Bud B A 6	6	4⅛x5½	40.8	83@2100	Pb	Zen	Vac	Aut	Br-L	C	7	Tim	Wo	98.2	B	D	175		8400	36x6S	36x14S
Commerce Series 100	5	5830	Bud B A 6	6	4¼x5½	40.8	83@2100	Pb	Zen	Vac	Aut	Br-L	C	7	Tim	Wo	95.0	B	D	175		9600	36x6S	40x14S
Day Elder 60	1	1195	Con 25 A	6	3⅜x4	27.3	61@3000	Pw	Zen	P	DR	W-G	U	4	Tim	Sp	36.3	4	4	135		3200	20x6.00B	20x6.50B
Day Elder 85	1½	1645	Con 16 C	6	3⅜x4⅝	27.3	65@2700	Pw	Zen	P	DR	W-G	U	4	Tim	Sp	42.3	4	4	135		3750	20x6.00B	20x6.50DB
Day Elder 110	2	2095	Con 16 C	6	3⅜x4⅝	27.3	65@2700	Pw	Zen	P	DR	Br-L	U	4	Tim	Sp	44.9	4	D	156		4600	20x7.00B	20x7.00DB
Day Elder 130	2½	2895	Con 16 R	6	4 x4¼	38.4	73@2400	Pw	Zen	P	DR	Br-L	U	4	Tim	Sp	40.7	4	D	150		6400	20x7.50B	20x7.50DB
Day Elder 160	3	3695	Con 18 R	6	4 x4½	38.4	82@2400	Pw	Zen	P	DR	Br-L	U	4	Tim	Wo	36.1	4	D	154		6600	20x7.50B	20x9.00DB
Day Elder 200	4	4295	Con 18 R	6	4 x4½	38.4	82@2400	Pw	Zen	P	DR	Br-L	U	4	Tim	Wo	43.5	4	D	156		7400	20x9.00B	20x9.00B
Day Elder 240	5	5500	Con 21 R	6	4⅜x4¾	45.9	100@2600	Pw	Zen	Vac	DR	Br-L	C	4	Tim	Wo	50.8	4	D	162		9300	38x9P	38x9DP
Day Elder 285	8	6000	Con 21 R	6	4⅜x4¾	45.9	100@2600	Pw	Zen	Vac	DR	Br-L	C	7	Tim	Wo	71.2	6	D	164		12000	20x8.25B	20x8.25DB
Day Elder 345	10	7500	Con 21 R	6	4⅜x4¾	45.9	100@2600	Pw	Zen	Vac	DR	Br-L	C	7	Tim	Wo	79.9	4	D	164		12500	20x9.00B	20x9.00DB
Day Elder 402	12	9000	Con 16 H	6	4¾x5¾	54.2	127@2300	Pw	Zen	P	DR	Br-L	C	7	Tim	Wo	84.6	4	D	164		14000	20x9 75B	20x9.75DB
Diamond T 216	1	695	Her JXA	6	3⅜x4¼	27.3	———	Pb	Zen	P	Aut	W-G	U	4	Cla	Sp	—	4H	D	135½		3130	20x6.50B	20x6.50B
Diamond T 291	1½	1475	Her WXA 2	6	3½x4½	29.4	60@2400	Pb	Zen	P	Aut	Cov	U	4	Cla	Sp	—	4H	D	156¼		4400	20x6.50B	20x6.50DB
Diamond T 303	2	1745	Her WXB	6	3⅜x4½	33.7	67@2400	Pb	Zen	P	Aut	Cov	U	4	Cla	Sp	—	4HV	D	159¾		5000	20x7.00B	20x7.00DB
Diamond T 551	2½	2250	Her WXC	6	4 x4¼	38.4	74@2400	Pb	Zen	P	Aut	Cov	U	4	Tim	Sp	—	4HV	D	168		5600	20x7.50B	20x7.50DB
Diamond T 501	2½	2675	Her WXC	6	4 x4¼	38.4	74@2400	Pb	Zen	P	Aut	Cov	U	4	Wisc	2R	—	4HV	D	176½		6400	20x8.25B	20x8.25DB
Diamond T 506	2½	3000	Her WXC 2	6	4¼x4½	43.3	85@2200	Pb	Zen	P	Aut	Cov	U	5	Wisc	2R	—	4HV	D	184		6400	20x8.25B	20x8.25DB
Diamond T 603	3	3300	Her YXC	6	4⅜x4¾	45.9	94@2200	Pb	Zen	P	Aut	Cov	U	5	Wisc	2R	—	4HV	D	169		7500	20x9.00B	20x9.00DB
Diamond T 606	3	3440	Her YXC 2	6	4½x4¾	48.6	100@2200	Pb	Zen	P	Aut	Cov	U	5	Wisc	2R	—	4HV	D	187½		7500	20x9.00B	20x9.00DB
Diamond T 750	4	4800	Her YXC 4	6	4⅝x5¼	51.3	———	Pb	Zen	P	Aut	Cov	C	5	Wisc	2R	—	4W	D	178		8300	22x9.75B	22x9.75DB
*Diamond T 801	4	4140	Her YXC	6	4⅜x4¾	45.9	94@2200	Pb	Zen	P	Aut	Br-L	C	7	Own	Wo	—	6HV	D	189½		8300	36x8P	4P 36x8
*Diamond T 1200	6	5600	Her YXC 2	6	4½x4¾	48.6	100@2200	Pb	Zen	P	Aut	Br-L	C	7	Tim	Wo	—	4RW	D	190		11000	34x7P	4wh 34x7D
*Diamond T 1600	8	6220	Her YXC 3	6	4⅝x4¾	51.3	104@2400	Pb	Zen	P	Aut	Br-L	C	7	Tim	Wo	—	4RW	D	190		11700	36x8P	4wh 36x8D
*Diamond T 1601	8	7500	Wak 6RB	6	5 x5¾	60.0	127@2000	Pb	Zen	P	Aut	Br-L	C	7	Tim	Wo	—	4RW	D	194		12500	36x8P	4wh 36x8D
Dodge Bros. UF10	½	435	Own	4	3⅜x4¾	21.2	48@2800	Pb	Car	P	DR	Own	U	3	Own	Sp	14.28	4	D	109		1925	5.00x19	5.00x19
Dodge Bros F10	½	515	Own	6	3⅛x4½	23.4	61@3400	Pb	Car	P	DR	Own	U	3	Own	Sp	14.28	4	D	109		1975	5.25x19	5.25x19
Dodge Bros. U1	¾	695	Own	4	3⅜x4¼	21.3	45@2800	Pb	Car	Vac	NE	Own	U	3	Own	Sp	21.68	4	D	124		2260	5.50x20B	5.50x20B
Dodge Bros. DA1	¾	795	Own	6	3⅜x3⅞	27.3	63@3200	Pb	Zen	Vac	NE	Own	U	4	Own	Sp	36.83	4	D	124		2360	5.50x20	5.50x20
Dodge	1	795	Own	4	3⅜x4¼	21.0	45@2800	P	Car	Vac	NE	Own	—	3	Own	Sp	36.13	H	—	133		2590	6.00x20	32x6
Dodge	1	895	Own	6	3⅜x3⅞	27.3	63@3200	P	Zen	Vac	NE	Own	—	3	Own	Sp	33.45	H	—	133		2690	6.00x20	32x6
Dodge Bros. UF30	1½	595	Own	4	3⅜x4¾	21.0	48@2800	Pb	Car	P	DR	Own	U	4	Own	Sp	37.17	4	D	136		2581	6.00x20	32x6
Dodge Bros. F30	1½	695	Own	6	3⅛x4½	23.4	61@3400	Pb	Car	P	DR	Own	U	4	Own	Sp	37.17	4	D	136		2631	6.00x20	32x6
Dodge Bros. F35	1½	1425	Own	6	3⅜x3⅞	27.3	63@3200	Pb	Zen	P	DR	Own	U	4	Own	Sp	41.43	4	D	140		3780	6.00x20	6.00x20D
Dodge Bros. F36	1½	1485	Own	6	3⅜x3⅞	27.3	63@3200	Pb	Zen	P	DR	Own	U	4	Own	Sp	41.43	4	D	165		3972	6.00x20	6.00x20D
*Dodge Bros. F40	2	1995	Own	6	3⅝x5	31.5	96@3000	Pb	Zen	P	DR	Own	U	4	Own	Sp	43.73	4	D	150		5173	6.50x20	6.50x20D
*Dodge Bros. F41	2	2085	Own	6	3⅝x5	31.5	96@3000	Pb	Zen	P	DR	Own	U	4	Own	Sp	43.73	4	D	165		5211	6.50x20	6.50x20D
Dodge	3	1845	Own	6	3⅜x4½	27.3	78@3000	P	Zen	Vac	NE	Own	—	4	Own	Sp	46.31	H	—	135		4235	32x6	32x6D
Dodge	3	1895	Own	6	3⅜x4½	27.3	78@3000	P	Zen	Vac	NE	Own	—	4	Own	Sp	41.43	H	—	165		4520	32x6	32x6D
Dodge	3	1945	Own	6	3⅜x4½	27.3	78@3000	P	Zen	Vac	NE	Own	—	4	Own	Sp	46.31	H	—	185		4715	32x6	32x6D
Dodge Bros. F60	3	2645	Own	6	3⅝x5	31.5	96@3000	Pb	Zen	P	DR	Own	U	4	Own	Sp	48.87	4	D	146		5543	32x6	32x6D
*Dodge Bros. F61	3	2575	Own	6	3⅝x5	31.5	96@3000	Pb	Zen	P	DR	Own	U	4	Own	Sp	48.87	4	D	170		5789	32x6	32x6D
*Dodge Bros. F62	3	2695	Own	6	3⅝x5	31.5	96@3000	Pb	Zen	P	DR	Own	U	4	Own	Sp	48.87	4	D	195		5901	32x6	32x6D
Essex Commercial	¾	445	Own	6	2¾x4½	18.2	———	CS	Mar	Vac	Aut	Own	U	3	Own	Sp	17.8	4	4	110		1930	30x5	31x5.50
Federal D	1½	795	Con W 10	4	3⅞x4¼	24.0	48@2500	Pb	Zen	P	DR	W-G T9	U	4	Cla	Sp	40.8	4	Tr	131		3225	6.00x20	32x6
Federal E6	1½	895	Con 17 E	6	3⅜x4	27.3	60@2600	Pb	Zen	Vac	DR	W-G T9	U	4	Cla	Sp	34.6	4	Tr	132		3275	6.00x20	32x6
Federal F7	1½	1525	Con 16 C	6	3⅜x4⅝	27.3	64@2500	Pb	Zen	P	DR	Own	U	4	Tim	Sp	29.2	4	Tr	132		3765	30x5	30x5D
Federal A6	2	1855	Con 16 C	6	3⅜x4⅝	27.3	64@2500	Pb	Zen	Vac	DR	Own	C	4	Cla	Sp	38.5	4	Tr	151		4580	32x6	32x6D
Federal A6T	2½	2185	Con 16 C	6	3⅜x4⅝	27.3	64@2500	Pb	Zen	Vac	DR	Own	C	4	Tim	Sp	41.3	4	Tr	151		4950	32x6	32x6D
Federal A6TW	2½	2360	Con 16 C	6	3⅜x4⅝	27.3	64@2500	Pb	Zen	Vac	DR	Own	C	4	Tim	Wo	42.0	4	Tr	151		4950	32x6	32x6D
*Federal 2DSW	2½-3	1050	Con W 10	4	3⅞x4¼	24.0	48@2500	Pb	Zen	P	DR	W-G T9	U	4	Cla	Sp	40.8	4	Tr	140		3925	6.00x20	32x6
*Federal 2ESW	2½-3	1150	Con 17 E	6	3⅜x4	27.3	60@2600	Pb	Zen	Vac	DR	W-G T9	U	4	Cla	Sp	40.8	4	Tr	145		3980	6.00x20	32x6
Federal T10B	2½-3	2740	Con 16 R	6	4 x4½	38.4	75@2200	Pb	Zen	P	DR	Own	C	4	Tim	Sp	44.5	4	Tr	165		6550	34x7	34x7D
Federal T10W	2½-3	2915	Con 16 R	6	4 x4½	38.4	75@2200	Pb	Zen	P	DR	Own	C	4	Tim	Wo	44.0	4	Tr	165		6550	34x7	34x7D
Federal U6	3-3½	3860	Con 18 R	6	4 x4½	38.4	85@2200	Pb	Str	P	DR	Br-L 55	C	7	Tim	Wo	64.6	4	D	165		7220	34x7	34x7D
Federal 4C6A	4-5	4735	Con 20 R	6	4½x4¾	40.8	90@2200	Pb	Zen	P	DR	Br-L 55	C	7	Tim	Wo	72.2	4	D	192		8330	36x8	36x8D
Federal 4C6AB	4-5	4960	Con 20 R	6	4½x4¾	40.8	90@2200	Pb	Zen	P	DR	Br-L 55	C	7	Tim	Wo	72.2	4	D	192		8850	36x8	36x8D
*Federal U6SW	6	6000	Con 20 R	6	4½x4¾	40.8	90@2200	Pb	Zen	P	DR	Br-L 55	C	7	Tim	Wo	71.3	6	Tr	201		10300	34x7	34x7D
*Federal U6SWAB	6	6500	Con 20 R	6	4½x4¾	40.8	90@2200	Pb	Zen	P	DR	Br-L 55	C	7	Tim	Wo	71.3	6	Tr	201		10300	34x7	34x7D
Federal X8	7½	5085	Con B 7	4	5 x6	40.0	61@1350	Pw	Zen	Vac	AB	Br-L 60	C	7	Tim	Wo	110.9	R	D	162		9750	36x6S	40x14S
*Federal X8R	7½	5810	Con 21 R	6	4⅜x4¾	45.9	100@2200	Pb	Zen	P	DR	Br-L 60	C	7	Tim	Wo	110.9	R	D	162		10000	40x8	40x8D
*Federal 4C6SW	8	7500	Con 21 R	6	4⅜x4¾	45.9	100@2200	Pb	Zen	P	DR	Br-L 55	C	7	Tim	Wo	80.8	6	Tr	231		12380	36x8	36x8D
Ford AA	1½	495	Own	4	3⅞x4¼	24.0	40@2200	Sp	Zen	Gra	Own	Own	U	4	Own	St	42.24	4	R	131½		2723	6.00x20	32x6
Ford AA	1½	525	Own	4	3⅞x4¼	24.0	40@2200	Sp	Zen	Gra	Own	Own	U	4	Own	St	42.24	4	R	157		2811	6.00x20	6.00x20
F W D— "	1½	3325	Wis S U	4	4 x5	25.6	50@2000	Pb	Zen	Vac	Eis	Cotta	C	4	Own	St	38.1	4	R	121		5300	34x7	34x7
F W D	2	3425	Wak	6	3¾x4¾	33.7	72@2500	Pb	Zen	Vac	Eis	Br-L	U	4	Own	St	35.0	4	R	133		5500	34x7	34x7
F W D [illegible]	2	3900	Wak	6	3¾x4¾	33.7	72@2500	Pb	Zen	Vac	Eis	Br-L	C	7	Own	St	84.7	4	R	137½		6000	36x8	36x8
F W D—[illegible]6	2½	4000	Wak	6	3¾x4¾	33.7	72@2500	Pb	Zen	P	Eis	Br-L	C	7	Own	St	101.0	4	R	138		6400	36x8	36x8
F W D—B	3	4200	Own	4	4¾x5½	36.1	56@1350	Pb	Str	Gra	Eis	Own	C	3	Own	St	35.6	4	R	124		6460	36x6S	36x6S
F W D—BT	3-3½	4742	Wak	6	4⅛x5½	40.8	92@2300	Pb	Zen	Vac	Eis	Own	C	5	Own	St	101.0	4	R	137¾		7700	40x7S	40x58D
F W D—CU6	3½	5120	Wak	6	4⅛x5½	40.8	92@2300	Pb	Zen	Vac	Eis	Own	C	5	Own	St	88.6	4	R	148		7500	38x9	38x9
F W D—SSU	4	5220	Wak	6	4⅜x5½	45.9	102@2200	Pb	Zen	Vac	Eis	Own	C	5	Own	St	88.6	4	R	148		7600	38x9	38x9
F W D—M5	5	7600	Wak	6	4⅜x5½	45.9	102@2200	P	Zen	P	Aut	Br-L	U	8	Wis	2R	193.1	4V	4-D	165		11800	12.75x20B	12.75x20B
*F W D—X6	6	6500	Wak	6	4⅜x5½	45.9	102@2200	Pb	Zen	Vac	Eis	Own	C	5	Own	St	88.6	*	4	170		9500	38x8	38x8
F W D—M7	7½	8700	Wak	6	5 x5¾	60	127@2000	P	Zen	P	Aut	Br-L	U

Major Specifications and Mechanical Details of 1931 Commercial Cars

Make and Model	Capacity—Tons or Lbs.	Chassis Price	Engine	No. of Cyls.	Bore and Stroke	Tax H. P.	Max. Brake H. P at Specified R. P. M.	Oil System	Carburetor	Fuel Feed	Ignit. System	Gear Set	Location	No. Spds. For.	Rear Axle	Final Drive	Reduction in Low	Brakes, Foot	Brakes, Hand	Standard Wheel Base	Chassis Weight	Standard Tire Sizes Front	Rear
†Gramm CX	2	1095	Con W-11	4	4½x4¼	27.2	55@2600	Pb	Til	P	Aut	W-G	U	4	Tim	Sp	37	4	D	131	3300	6.50x20	6.50x20D
Gramm CX	2	1295	Con 16 C	6	3⅜x4⅜	27.3	70@3000	Pb	Til	P	Aut	W-G	U	4	Tim	Sp	37	4	D	131	3300	6.50x20	6.50x20D
*Gramm D	2½	1995	Lyc ASD	6	3¾x4½	33.7	90@2200	Pb	Zen	P	Aut	Cov	U	4	Tim	Sp	33	4	D	160	5100	7.50x20	7.50x20D
*Gramm E	3	2595	Lyc TS	6	3⅞x5	36	90@2200	Pb	Zen	P	Aut	Cov	U	4	Tim	Sp	35	4	D	160	5500	8.25x20	8.25x20D
*Gramm EY	3	3595	Con 20 R	6	4½x4¾	40.80	90@2200	Pb	Zen	P	Aut	Cov	U	4	Tim	Sp	30	4	D	190	6750	7.50x20	7.50x20D
*Gramm T-38	3	3593	Lyc TS	6	3⅞x5	36	90@2200	Pb	Zen	P	Aut	Ful	U	4	Wis	2R	45	D	R	153	7200	36x5S	36x10S
*Gramm O-45	4	3995	Lyc TS	6	3⅞x5	36	85@2200	Pb	Zen	P	Aut	Ful	C	8	Wis	2R	75.8	D	R	153	7700	36x5S	36x12S
*Gramm GY	4	4345	Con 21 R	6	4⅜x4¾	45.9	100@2200	Pb	Zen	P	Aut	Cov	U	4	Wis	2R	28	4	D	210	7200	8.25x20	8.25x20D
Gramm GW	4	5175	Con 21 R	6	4⅜x4¾	45.9	100@2200	Pb	Zen	P	Aut	Cov	U	4	Wis	2R	—	4W	D	157	8900	9.00x20	9.00x20D
*Gramm O-60	5	4745	Lyc TS	6	3⅞x5	36	—	Pb	Zen	P	Aut	Ful	C	8	Wis	2R	78.4	D	R	153	8800	36x6S	36x14S
*Gramm HY	5	6545	Con 16 H	6	4¾x5¾	54.15	127@2300	Pb	Zen	P	Aut	Ful	U	4	Wis	2R	25.2	4	D	236	9600	36x8	36x8D
Indiana 60	*6000	995	Con	6	3⅜x4	27.3	61@3000	Pb	Str	P	Aut	W-G	U	3	Col	Sp	19.8	4	Tr	132	3200	30x5	30x5
Indiana 64	6500	1195	Con	6	3⅜x4⅝	27.3	65@2700	Pb	Str	Vac	Aut	Br-L	U	4	Col	Sp	21.3	4	Tr	137	3400	30x5	30x5
Indiana 74	7500	1290	Con	6	3⅜x4⅝	27.3	65@2700	Pb	Str	Vac	Aut	Br-L	U	4	Col	Sp	25.6	4	Tr	137	3450	32x6	32x6
Indiana 80	9000	1525	Con	6	3⅜x4⅝	27.3	65@2700	Pb	Str	Vac	Aut	Br-L	U	4	Col	Sp	20.9	4	Tr	149	3650	32x6	32x6
Indiana 111 X W	12500	1850	Her	4	4 x5	25.6	46@2000	Pb	Str	Vac	Eis	Br-L	U	4	Wis	2R	35.2	R	Tr	120	3740	32x6	32x6D
Indiana 120	12000	1990	Con	6	4 x4⅛	38.4	73@2400	Pb	Str	P	Aut	Br-L	U	4	Tim	Sp	31.3	4H	Tr	156	5200	32x6	32x6L
Indiana 140	14000	2495	Con	6	4 x4⅛	38.4	73@2400	Pb	Str	P	Aut	Br-L	U	4	Wis	2R	35.3	4HV	D	156	5500	32x6	32x6D
Indiana 141	17000	2935	Con	6	4 x4⅛	38.4	73@2400	Pb	Str	P	Aut	Br-L	U	4	Wis	2R	46.2	4HV	D	170	6200	32x6	32x6L
Indiana 170	17000	3160	Con	6	4½x4¾	40.8	89@2400	Pb	Str	P	Aut	Br-L	U	4	Wis	2R	46.6	4HV	D	170	6800	32x6	32x6D
Indiana 175	17500	3660	Con	6	4⅜x4¾	45.9	100@2400	Pb	Str	P	Aut	—	U	5	Wis	2R	45.3	4HV	D	170	7200	34x7	34x7D
Indiana 195	19500	3820	Con	6	4¼x4¾	40.8	89@2400	Pb	Str	P	Aut	Br-L	U	4	Wis	2R	49.5	4HV	D	170	7500	34x7	34x7L
Indiana 190	19000	4185	Con	6	4½x4¾	40.8	89@2400	Pb	Str	P	Aut	Br-L	C	7	Tim	Wo	78.6	RV	D	168½	7625	34x7	34x7D
Indiana 220	22500	4560	Con	6	4⅜x4¾	45.9	100@2400	Pb	Str	P	Aut	Br-L	U	4	Wis	2R	50.7	4HV	D	170	8200	36x8	36x8L
Indiana 250	25000	5950	Con	6	4⅜x4¾	45.9	100@2400	Pb	Str	P	Aut	Br-L	U	4	Tim	Wo	63.7	4HMV	D	182	10000	40x8	40x8D
Indiana 290	30000	7250	Con	6	4¾x5¾	54.1	116@1800	Pw	Str	P	L-N	Br-L	C	7	Tim	Wo	95.0	4W	D	182	10750	38x7P	40x14S
*Indiana 640	40000	9700	Con	6	4¾x5¾	54.1	116@1800	Pw	Str	P	L-N	Br-L	C	7	Tim	Wo	90.9	4W	D	212	14000	38x7P	36x10S
International AW1	¾	720	Wak X A	4	3½x4½	19.6	30@2700	Pb	Zen	Vac	DR	Mec	U	3	Own	Sp	17.4	4	2	136	2620	5.25x20	5.25x20
Internat'n'l Sp. Del.	¾	720	Wak X A	4	3½x4½	19.6	30@2700	Pb	Zen	Vac	DR	Mec	U	3	Eat	Sp	60.3	4	2	124	2200	5.25x30	5.25x30
Intern'l 6 Spd. Spec.	1	820	Wak X A	4	3½x4½	19.6	30@2700	Pb	Zen	Vac	DR	Mec	U	3	Eat	Sp	52.6	4	2	124	2430	30x5	30x5
International S24	1¼	1160	Lyc C T	4	3¾x5	22.5	43@2350	Pw	Zen	Vac	DR	Own	U	3	Eat	Sp	21.3	4	2	130	3200	30x5	30x5
International S26	1¼	1310	Lyc 4 S L	6	3¼x4½	25.3	61@2800	Pb	Zen	Vac	DR	Own	U	3	Eat	Sp	21.3	4	2	130	3250	30x5	30x5
International AW2	1½	675	Wak X A	4	3½x4½	19.6	30@2700	Pb	Zen	Vac	DR	Mec	U	3	Own	Sp	60.3	4	2	136	2980	5.50x20	6.00x20
International SF34	1½	1450	Lyc C T	4	3¾x5	22.5	43@2350	Pw	Zen	Vac	DR	Own	U	3	Eat	Sp	22.6	4	2	140	3520	30x5	32x6
International AL3	1½	1450	Lyc SLH	6	3¼x4½	25.3	61@2800	Pb	Zen	Vac	DR	W-G	U	4	Own	Sp	42.9	4	2	138	4300	6.00x20	6.00x20L
International SF36	1½	1606	Lyc 4 S L	6	3¼x4½	25.3	61@2800	Pb	Zen	Vac	DR	Own	U	3	Eat	Sp	22.6	4	2	140	3570	30x5	32x6
International SD44	2	1590	Lyc C T	4	3¾x5	22.5	43@2350	Pw	Zen	Vac	AB	Own	U	4	Eat	Sp	40.6	4	2	117	3700	30x5	32x6
International SD46	2	1740	Lyc 4 S L	6	3¼x4½	25.3	61@2800	Pb	Zen	Vac	AB	Own	U	4	Eat	Sp	40.6	4	2	117	3750	30x5	32x6
International SF46	2	1950	Lyc 4 S L	6	3¼x4½	25.3	61@2800	Pb	Zen	Vac	DR	Own	U	4	Eat	Sp	40.6	4	2	140	4000	32x6	32x6D
International A4	2	1985	Own F B B	6	3⅝x4½	31.5	65@2800	Pb	Zen	Vac	DR	Own	U	5	Own	Sp	47.8	4	2	145	5070	32x6	32x6D
International HS54	2½	3850	Hall-S 151	4	4¼x5½	28.9	54@1800	Pb	Zen	Vac	RB	Own	U	5	Eat	2R	60.5	4	4	148	8000	36x5S	36x8S
International HS54C	2½	3850	Hall-S 151	4	4¼x5½	28.9	54@1800	Pb	Zen	Vac	RB	Own	U	5	Own	Ch	63.8	4	4	148	8665	36x5S	36x10S
International W1	2½	3850	Hall-S 151	4	4¼x5½	28.9	54@1800	Pb	Zen	Vac	RB	Own	U	5	Own	2R	60.5	4	2	148	8300	36x5S	36x8S
International A5	3	2550	Own F B B	6	3⅝x4½	31.5	65@2800	Pb	Zen	Vac	DR	Own	U	5	Own	Sp	52.6	4	2	156	5606	34x7	34x7D
International A6	3	2675	Own B B	6	3⅝x4½	31.5	65@2800	Pb	Zen	Vac	DR	Own	U	5	Own	Sp	62.5	4	2	156	5750	34x7	34x7D
International HS74	3½	4850	Hall-S 152	4	4¾x5½	36.1	60@1800	Pb	Zen	Vac	RB	Own	U	5	Eat	2R	70.5	4	4	160	10700	36x5S	40x12S
International HS74C	3½	4850	Hall-S 152	4	4¾x5½	36.1	60@1800	Pb	Zen	Vac	RB	Own	U	5	Own	Ch	79.1	4	4	160	11000	36x6S	40x12S
International W3	3½	4850	Hall-S 152	4	4¾x5½	36.1	60@1800	Pb	Zen	Vac	RB	Own	U	5	Own	2R	70.5	4	2	160	10145	36x6S	40x12S
Internat'n'l HS104C	5	5500	Hall-S 152	4	4¾x5½	36.1	60@1800	Pb	Zen	Vac	RB	Own	U	5	Own	Ch	90.5	4	4	160	11095	36x6S	40x14S
La France-Rep. A1	6000	795	Lyc	6	3 x4¾	21.5	60@2500	Pb	Zen	Vac	Aut	Ful	U	4	Tim	Sp	36.1	4	Tr	132	3000	5.50x20	32x6
La France-Rep. C1	7500	1295	Lyc	6	3¼x4½	25.4	61@2750	Pb	Zen	Vac	Aut	Ful	U	4	Tim	Sp	29.1	4	Tr	144	3300	6.00x20	32x6
La France-Rep. D1	9000	1595	Lyc	6	3¼x4½	25.4	61@2750	Pb	Zen	Vac	Aut	Ful	U	4	Tim	Sp	37.9	4	Tr	144	3725	30x5	30x5L
La France-Rep. F2	13000	2395	Lyc	6	3⅝x5	31.5	83@2800	Pb	Zen	Vac	Aut	Ful	U	4	Tim	Sp	40.1	4	D	174	5520	32x6	32x6D
La France-Rep. H2	16000	2985	Lyc	6	3⅞x5	36.0	80@2500	Pb	Zen	Vac	Aut	Ful	U	4	Wis	2R	4.16	4	D	174	6370	34x7	34x7D
La France-Rep. M2	20000	4000	Wak	6	4⅜x5⅛	46.0	97@2000	Pb	Zen	Vac	Aut	Ful	U	5	Wis	2R	48.1	4	D	174	7500	36x8	36x8D
La France-Rep. 35-2	24000	5600	Wak	6	4½x5¾	48.6	98@1850	Pb	Zen	Vac	Aut	Ful	U	4	Wis	2R	45.4	4	D	174	9250	38x9	38x9D
Mack BL	1	3800	Own	6	3¼x5	25.39	63@2800	Pw	Str	Vac	NE	Own	U	4	Own	Sp	Opt	4	D	148	——	B6.00x20	DB6.00x20
††Mack BG	1½	3000	Own	6	3⅜x5	31.57	75@2600	Pw	Str	Vac	NE	Own	U	4	Own	Sp	Opt	4	D	156	——	32x6	D32x6
Mack AB	2½-3	3950	Own	4	4¼x5	28.9	60@2200	Pb	Str	Gra	RB	Own	U	4	Own	2R	Opt	R	D	2-Opt	——	36x4S	36x8S
††Mack AB	2½-3	3500	Own	4	4¼x5	28.9	60@2200	Pb	Str	Gra	RB	Own	U	4	Own	Ch	Opt	R	D	2-Opt	——	36x4S	36x8S
Mack AB	2½-3	4750	Own	6	3⅜x5	31.57	75@2600	Pw	Str	Vac	NE	Own	U	4	Own	2R	Opt	R	D	2-Opt	——	34x7	D34x7
††Mack AB	2½-3	4300	Own	6	3⅜x5	31.57	75@2600	Pw	Str	Vac	NE	Own	U	4	Own	Ch	Opt	R	D	2-Opt	——	34x7	D34x7
††Mack B	3-4	5250	Own	6	4 x5½	38.4	100@2300	Pb	Str	Vac	NE	Own	U	4	Own	2R	Opt	4	D	2-Opt	——	36x8	D36x8
††Mack BC	3½-5	5500	Own	6	4 x5½	38.4	100@2300	Pb	Str	Vac	NE	Own	U	4	Own	Ch	Opt	4	D	2-Opt	——	36x8	36x8D
††Mack BJ	3½-5	6150	Own	6	4½x5½	48.6	126@2200	Pb	Str	Vac	L-N	Own	C	4	Own	2R	Opt	4	D	3-Opt	——	36x8	36x8D
††Mack AK	3½-5	5150	Own	4	5 x6	40.0	77@1800	Pb	Str	Gra	RB	Own	J	4	Own	Ch	Opt	4	J	3-Opt	——	36x5S	36x5DS
††Mack AK	3½-5	5250	Own	4	5 x6	40.0	77@1800	Pb	Str	Gra	RB	Own	C	4	Own	2R	Opt	4	D	3-Opt	——	36x5S	36x5DS
††Mack AC	3½-5	4950	Own	4	5 x6	40.0	77@1800	Pb	Str	Gra	RB	Own	J	4	Own	Ch	Opt	J	R	3-Opt	——	36x5S	40x10S
††Mack AK	3½-5	6450	Own	6	4½x5½	48.6	126@2200	Pb	Str	Vac	L-N	Own	C	4	Own	2R	Opt	4	D	3 Opt	——	10.50x22B	10.50x22DB
††Mack AC	5½-7	5500	Own	4	5 x6	40.0	77@1800	Pb	Str	Gra	RB	Own	J	4	Own	Ch	Opt	J	R	3-Opt	——	36x6S	40x12S
††Mack AC	5½-7	6550	Own	6	4½x5½	48.6	126@2200	Pb	Str	Vac	L-N	Own	J	4	Own	Ch	Opt	4	J	3 Opt	——	10.50x24B	10.50x24DB
††Mack AC	7½	6000	Own	4	5 x6	40.0	77@1800	Pb	Str	Gra	RB	Own	J	4	Own	Ch	Opt	J	R	3-Opt	——	36x7S	40x14S
††Mack AC	7½	6000	Own	6	5 x6	40.0	150@2000	Pb	Str	Gra	NE	Own	J	4	Own	Ch	Opt	R	J	3-Opt	——	36x7S	40x8DS
††Mack AP	7½	9500	Own	4	5 x6	40.0	77@1800	Pb	Str	Gra	RB	Own	J	4	Own	Ch	Opt	4R	J	3-Opt	——	36x7S	40x12S
††Mack AC 6-wheel	10	7500	Own	4	5 x6	40.0	77@1800	Pb	Str	Gra	RB	Own	J	4	Own	Ch	Opt	4R	J	3-Opt	——	36x7S	40x12S
††Mack AP 6-wheel	10	12000	Own	6	5 x6	60.0	150@2000	Pb	Str	Gra	NE	Own	J	4	Own	Ch	Opt	4R	J	3-Opt	——	36x7	40x12S
Paige	½	*895	Own	6	3⅛x4½	23.44	66@3200	Pb	DL	P	DR	—	U	3	—	Sp	14.27	4	Tr	115	——	5.50x18B	5.50x18B
Pierce-Arrow PT	2	2950	Own	6	3¾x4½	33.5	70@2600	Pb	Zen	P	DR	Cla	U	4	Tim	Sp		4	V	160	5600	7.50x20B	7.50x20B
Pierce-Arrow PW	3	4150	Own	6	4⅛x4½	40.3	77@2400	Pb	Zen	P	DR	Cov	U	4	Tim	*Wo		4	W	150	6800	9.00x20B	9.00x20B
Pierce-Arrow PX	4	5375	Own	6	4⅝x4¾	51.3	103@2200	Pb	Zen	P	DR	Cov	C	4	Tim	Wo	—	—	—	160	9400	10.50x20B	10.50x20B
Pierce-Arrow PY	5	5950	Own	6	4⅝x4¾	51.34	103@2200	Pb	Zen	P	DR	Cov	C	4	Own	*Wo		4	W	160	10700	10.50x24B	10.50x24B
Pierce-Arrow PZ	8	6950	Own	6	4¾x5¾	54.15	130@2000	Pb	Zen	P	DR	Own	C	4	Own	*Wo		4	W	168	12800	36x7B	40x16B
Relay Series 15 AA	¾	1370	Con 17 E	6	3⅜x4	27.3	52@2200	Pb	Str	Vac	Aut	W-G	U	4	Own	2R	38.4	4	D	131	3750	30x5P	30x5P
Relay Series 15 AB	1	1400	Con 17 E	6	3⅜x4	27.3	52@2200	Pb	Str	Vac	Aut	W-G	U	4	Own	2R	38.4	4	D	131	3800	P30x5	P30x5
Relay Series S 11	1	1700	Bud H S 6	6	3⅜x4½	27.3	52@2200	Pb	Zen	Vac	Aut	Br-L	U	4	Own	2R	25.5	4	D	142	4050	30x5P	30x5P
Relay Series S 11	1½	1900	Bud H S 6	6	3⅜x4½	27.3	52@2200	Pb	Zen	Vac	Aut	Br-L	U	4	Own	2R	30.0	4	D	162	4500	30x5P	30x5DP
Relay Series 40	1½	2990	Bud D S 6	6	3⅝x5	31.5	56@2000	Pb	Zen	Vac	Aut	Br-L	U	4	Own	2R	34.5	4	D	168	5300	34x5P	34x5DP
Relay Series 40	2	3240	Bud D S 6	6	3⅝x5	31.5	56@2000	Pb	Zen	Vac	Aut	Br-L	U	4	Own	2R	34.5	4	D	168	5500	36x6	D36x6
Relay Series 50	2	3860	Bud D W 6	6	3¾x5	33.7	73@2200	Pb	Zen	Vac	Aut	Br-L	U	5	Own	2R	58.5	4	D	161	6800	36x6	D36x6
Relay Series S 11	2	2030	Bud H S 6	6	3⅜x4½	27.3	52@2200	Pb	Zen	Vac	Aut	Br-L	U	4	Own	2R	30.0	4	D	162	4700	32x6P	32x6DP
Relay Series 40	2½	3275	Bud D S 6	6	3⅝x5	31.5	56@2000	Pb	Zen	Vac	Aut	Br-L	U	4	Own	2R	34.5	4	D	168	5700	36x6	D36x6
Relay Series 50	2½	4000	Bud D W 6	6	3¾x5	33.7	73@2200	Pb	Zen	Vac	Aut	Br-L	U	5	Own	2R	58.5	4	D	161	7000	36x6	D38x7
Relay Series 60	2½	4555	Bud B A 6	6	4⅛x5⅛	40.8	83@2100	Pb	Zen	Vac	Aut	Ful	C	5	Own	2R	58.5	4	D	175	7350	36x6	D36x6
Relay Series 50	3	4130	Bud D W 6	6	3¾x5	33.7	83@2100	Pb	Zen	Vac	Aut	Br-L	U	5	Own	2R	58.5	4	D	161	7200	36x6	D40x8
Relay Series 60	3	4595	Bud B A 6	6	4⅛x5⅛	40.8	83@2100	Pb	Zen	Vac	Aut	Ful	C	5	Own	2R	58.5	4	D	175	7500	36x6	D38x7
Relay Series 80	3	5170	Bud B A 6	6	4⅛x5⅛	40.8	83@2100	Pb	Zen	Vac	Aut	Cov	C	8	Own	2R	84.18	4	D	175	7800	36x6	S40x12
Relay Series 60	3½	4745	Bud B A 6	6	4⅛x5⅛	40.8	83@2100	Pb	Zen	Vac	Aut	Ful	C	5	Own	2R	58.5	4	D	175	7800	38x7	D40x8
Relay Series 80	3½	5330	Bud B A 6	6	4⅛x5⅛	40.8	83@2100	Pb	Zen	Vac	Aut	Cov	C	8	Own	2R	84.18	4	D	175	8600	36x6	S40x12
Relay Series 80	4	5380	Bud B A 6	6	4⅛x5⅛	40.8	83@2100	Pb	Zen	Vac	Aut	Cov	C	8	Own	2R	84.18	4	D	175	8800	38x7	S40x14
Relay Series 50 SW	5	5505	Bud D W 6	6	3¾x5	33.7	83@2100	Pb	Zen	Vac	Aut	Br-L	U	5	Own	2R	58.7	6	D	152	8600	36x6P	36x6DP
Relay Series 100	5	6615	Con 21 R	6	4⅜x4¾	45.9	100@2200	Pb	Str	Vac	Aut	Ful	C	5	Own	2R	58.5	4	D	230	10000	9.00x24	D9.00x24
Relay Series 60 SW	7	6545	Bud B A 6	6	4⅛x5⅛	40.8	100@2200	Pb	Zen	Vac	Aut	Ful	U	5	Own	2R	63.6	6	D	175	12000	38x7P	40x8DP
Relay 100 B	5-7½	6900	Bud G E 6	6	4¾x6	54.1	415@1000	Pb	Zen	P	Aut	Br-L	U	4	Own	2R	49.7	4	D	220	11200	9.75x24	9.75x24D
Reo 15 Junior	½	785	Con 19 E	6	3⅜x4	27.3	60@2800	Pw	Sch	P	DR	W-G	U	3	Sal	Sp	14.63	4	Tr	115	2290	6.00x18	6.00x18
Reo D F 129	1	1095	Own C A	6	3⅜x5	27.3	85@3200	Pw	Sch	Vac	DR	Own	U	3	Own	Sp	17.1	4	Tr	135	3200	6.00x20	32x6
Reo D F	1	1095	Own C A	6	3⅜x5	27.3	85@3200	Pw	Sch	Vac	DR	Own	U	3	Own	Sp	17.1	4	Tr	135	3200	6.00x20	32x6
Reo F A	1½	1295	Own	6	3⅜x5	27.3	70@2800	Pw	Sch	Vac	DR	Own	U	4	Own	Sp	34.32	4	Tr	137	3525	6.00x20	32x6
Reo F E	1½	1395	Own	6	3⅜x5	27.3	70@2800	Pw	Sch	Vac	DR	Own	U	4	Own	Sp	34.32	4	Tr	152	3700	6.00x20	32x6
Reo F F	1½	1395	Own	6	3⅜x5	27.3	70@2800	Pw	Sch	Vac	DR	Own	U	4	Own	Sp	34.32	4	Tr	156	3750	6.00x20	32x6
Reo F H	2	1595	Own	6	3⅜x5	27.3	70@2800	Pw	Sch	Vac	DR	Own	U	4	Own	Sp	37.6	4	Tr	142	4165	32x6	32x6D
Reo F C	2	1645	Own	6	3⅜x5	27.3	70@2800	Pw	Sch	Vac	DR	Own	U	4	Own	Sp	37.62	4	Tr	152	4025	32x6	32x6D
Reo F D	2	1745	Own	6	3⅜x5	27.3	70@2800	Pw	Sch	Vac	DR	Own	U	4	Own	Sp	37.62	4	Tr	168	4075	32x6	32x6D
Reo G A	3	2035	Own	6	3⅜x5	27.3	70@2800	Pw	Sch	Vac	DR	Own	U	4	Own	Sp	41.05	4	Tr	163	4625	32x6	32x6D
Reo G C	3	2140	Own	6	3⅜x5	27.3	70@2800	Pw	Sch	Vac	DR	Own	U	4	Own	Sp	41.05	4	Tr	179	4850	32x6	32x6D
Reo G D	3	2085	Own	6	3⅜x5	27.3	70@2800	Pw	Sch	Vac	DR	Own	U	4	Own	Sp	78.1	4	Tr	144	4570	32x6	32x6D
Reo G C 5	3	2375	Own	6	3⅜x5	27.3	70@2800	Pw	Sch	Vac	DR	Own	U	4	Own	Sp	41.05	4	Tr	210	5320	32x6	32x6D
Reo G B	3	2290	Own C F	6	3⅜x5	27.3	70@2800	Pw	Sch	Vac	DR	Own	U	4	Own	Sp	40.52	4	Tr	179	——	7.50x20	7.50x20
Rugby 6-14	½	655	Con	6	3¼x4	25.4	58@3100	Pb	Str	P	Aut	Own	U	3	Own	Sp	15.6	4	4	——	2160	29x5	29x5
Rugby 6-15	1½	930	Con	6	3¼x4	25.4	58@3100	Pb	Str	P	Aut	Br-L	U	4	Sal	Sp	34.49	4	Tr	135	3000	5.50x20	30x5D
Selden 17 C	1½	1500	Con	6	3⅜x4	27.3	61@3000	Pb	Zen	Vac	Aut	Br-L	U	4	Tim	Sp	—	4	D	142	3900	32x6	32x6
Selden 317 C	1½	1610	Con	6	3⅜x4⅝	27.34	65@2760	Pb	Str	Vac	Aut	Br-L	U	4	Tim	Sp	—	4	D	142	3900	32x6	32x6
Selden 37 C	2	1935	Con	6	3⅜x4⅝	27.34	65@2760	Pb	Str	Vac	Aut	Br-L	U	4	Tim	Sp	—	4	D	151	4800	32x6	32x6D
Selden 39 C	2½	2920	Con	6	4 x4½	38.4	72@2400	Pb	Str	Vac	Aut	Br-L	U	4	Tim	Sp	—	4	D	164	5800	32x6	32x6D
Selden 47 C B	3	3785	Con	6	4 x4½	38.4	85@2400	Pb	Str	Vac	Aut	Br-L	U	4	Tim	Sp	—	4	D	171	7200	34x7	34x7D
Selden 47 C D	4	4435	Con	6	4 x4½	38.4	82@2400	Pb	Str	Vac	Aut	Br-L	U	5	Wis	2R	—	4	D	171	7600	36x8	36x8D
Selden 67 C	5	4975	Con	6	4⅜x4¾	45.94	100@2400	Pb	Str	Vac	Aut	Br-L	C	7	Wis	2R	—	4	D	171	8700	36x8	36x8D
Selden 77	7	7365	Con	6	4¾x5¾	54.15	127@2300	Pb	Str	Vac	Aut	Br-L	C	7	Wis	2R	—	4	D	178	11600	40x8	42x9D
Service Series S 11	1	1600	Bud H S 6	6	3⅜x4½	27.3	52@2200	Pb	Zen	Vac	Aut	Br-L	U	4	Col	Sp	25.5	4	D	142	3900	P30x5	P30x5
Service Series S 11	1½	1900	Bud H S 6	6	3⅜x4½	27.3	52@2200	Pb	Zen	Vac	Aut	Br-L	U	4	Tim	Sp	29.2	4	D	162	4300	P30x5	DP30x5
Service Series 40	1½	2990	Bud D S 6	6	3⅝x5	31.5	56@2000	Pb	Zen	Vac	Aut	Br-L	U	4	Tim	Wo	34.8	4	D	168	4700	P34x5	DP34x5
Service Series S 11	2	2030	Bud H S 6	6	3⅜x4½	27.3	52@2200	Pb	Zen	Vac	Aut	Br-L	U	4	Tim	Sp	29.2	4	D	162	4500	32x6	D32x6
Service Series 40	2	3240	Bud D S 6	6	3⅝x5	31.5	56@2000	Pb	Zen	Vac	Aut	Br-L	U	4	Tim	Wo	34.8	4	D	168	4900	36x6	D36x6
Service Series 40	2½	3240	Bud D S 6	6	3⅝x5	31.5	56@2000	Pb	Zen	Vac	Aut	Br-L	U	4	Tim	Wo	34.8	4	D	168	5100	P36x6	D36x6
Service Series 60	2½	4580	Bud B A 6	6	4⅛x5⅛

Production - - Engineering - - Factory -

Welding Outfit Designed For Light Work



NEW PUROX, No. 4008, welding outfit

The Linde Air Products Company, New York city, has introduced its new Purox welding outfit No. 4008. This outfit, with the new No. 11 Purox welding torch, is said to have a welding range from the lightest sheet metal to one-half inch plate. It is especially designed for welding shops, garages, maintenance departments and manufacturers in the metal working industries.

The outfit complete consists of a No. 11 welding torch, with five tips, horse connections and wrench; a No. 32 acetylene regulator, with 30 and 500 pounds gauges and hose connections; a No. 12 oxygen regulator; 12 feet of quarter-inch oxygen hose; 12½ feet of acetylene hose, regulator wrench, spark lighter, pair fiber spectacles, instruction manual.

The outfit, with wooden box, costs $65.

COLLINS APPOINTED OLDS ENGINEER

Appointment of P. A. Collins as experimental engineer for the Olds Motor Works has been announced by C. L. McCuen, director of engineering.

Electric Heated Annealing Furnaces for the Steel And Other Industries

By J. C. WOODSON

Manager Industrial Heating Engineering Department, Westinghouse Electric and Manufacturing Company, Mansfield, O.

The following is the concluding installment of a paper presented before the American Institute of Electrical Engineers' Pittsburgh convention, which closed March 13:

Bright Annealing in Artificial Atmospheres—The increasing and incessant demand for better surfaces on annealed mill and fabricated metal has resulted in a great deal of experimental and research work being done on artificial atmospheres for furnaces to secure these results. On the cold rolled strip furnaces mentioned above, we are using partially cracked and purified coke oven gas with success. In another place, treated blast furnace gas is also used. Such atmospheres are really not "reducing," that is, they do not reduce any scale or oxides which may be on the sheet before annealing, but merely prevent the formation of scale or oxide during the heating and cooling cycle. For mill anneals, this is usualy all that is required to produce satisfactorily clean metal. However, on other grades of metal, a higher finish is desired and different artificial atmospheres are necessary. The Westinghouse company and others have done a great deal of research work along this line. The results, briefly, are that several related gases or combinations of gases can be used successfully for this purpose, such as dissociated ammonia, dissociated butane, dissociated natural or city gas (with or without water vapor), hydrogen and dissociated methanol or wood alcohol.

The order given is approximately the order of desirability from a cost

(Continued on Page 16)

SEEK OIL INDUSTRY SUPPORT FOR RESEARCH

In a letter mailed to more than 400 oil companies, W. C. Teagle, Standard Oil Company of New Jersey, New York chairman of the committee on research of the institute's board of directors, has asked for contributions to a $100,000 fund to carry on the program of fundamental research conducted during the past five years by the American Petroleum Institute. A few weeks ago thirty-six of the larger companies were asked to contribute, and a number of them already have complied with the request.

Chairman Teagle declared it was the belief of his committee that it would be in the interest of economy and efficiency for units of the industry to join in supporting such a program, explaining that research provides needed information obtainable at a smaller cost through support of fellowships in universities and government laboratories than through individual company research laboratories.

The five-year program, which was financed by John D. Rockefeller and the Universal Oil Products Company, and which ends this year, Mr. Teagle said, has provided a large quantity of valuable data. Papers published or approved for publication in appropriate technical and scientific publications were said to number 140, and many additional papers are expected in the next few months as additional lines of investigation are brought to a point where it is appropriate to publish data obtained.

It is proposed to begin the new research program July 1. It will be planned and funds will be expended under the direction of the committee. Some projects of the present program not yet completed will be continued, but the new program contemplates taking up the most important research problems appropriate for co-operative study.

REPLACEMENT PARTS CATALOG ISSUED FOR FORD, CHEVROLET

The Simmons Manufacturing Company, Cleveland, O., has issued a catalog of replacement parts for Fords and Chevrolets.

CLASSIFIED ADVERTISEMENTS IN THE AUTOMOTIVE DAILY NEWS BRING RESULTS

Major Specifications and Mechanical Details of 1931 Commercial Cars

(Continued from Page 13)

Make and Model	Capacity—Tons or Lbs.	Chassis Price	Engine	No. of Cyl.	Bore and Stroke	Tax H. P.	Max. Brake H. P. Specified R. P. M.	Oil System	Carburetor	Fuel Feed	Ignit. System	Gear Set	Location	No. Spds. For.	Rear Axle	Final Drive	Reduction in Low	Brakes, Foot	Brakes, Hand	Standard Wheel Base	Chassis Weight	Standard Tire Sizes Front	Rear
Studebaker S-40	2	945	Own	6	3¼x4½	25.4	70@3200	Pb	Str	P	DR	W-G	U	4	Tim	Sp	37.4	4	4	136	3775	6.50x20	6.50x20D
Studebaker S-50	2	895	Own	6	3¼x4½	25.4	70@3200	Pb	Str	P	DR	W-G	U	4	Tim	Sp	37.4	4	4	148	3810	6.50x20	6.50x20D
Studebaker S-60	2	945	Own	6	3¼x4½	25.4	70@3200	Pb	Str	P	DR	W-G	U	4	Tim	Sp	37.4	4	4	160	3850	6.50x20	6.50x20D
Studebaker GN-N	4000	1245	Own	6	3⅜x4½	27.3	70@3200	Pb	Str	P	DR	Cla	U	4	Cla	Sp	33.5	4	D	148	3265	30x5	32x6
Studebaker 88	12500	3295	Own	8	3½x4⅜	39.2	115@3200	Pb	Str	P	DR	Ful	U	4	Eat	Sp	24.6	4V	D	184	5200	7.50x20	7.50x20D
Studebaker 99	14000	3795	Own	8	3½x4⅜	39.2	115@3200	Pb	Str	P	DR	Ful	U	4	Eat	Sp	24.6	4V	D	184	5680	7.50x20	7.50x20D
White 15 B	——	1545	Own GKA	4	3¾x5⅛	22.5	31@1600	CS	Zen	Vac	L-N	Own	C	4	Own	Sp	18.6	R	R	133½	3402	30x5	30x5
White 160	——	1700	Own GRCB	4	4 x5¾	25.6	45@1800	Pw	Zen	Vac	DR	Own	U	4	Own	Sp	19.5	4	Tr	138	4025	30x5	30x5
White 161	——	1850	Own GRCB	4	4 x5¾	25.6	45@1800	Pw	Zen	Vac	DR	Own	U	4	Own	Sp	19.5	4	Tr	138	4290	34x7	34x7
White 60	——	1850	Own 2 A	6	3½x4½	29.4	54@2100	Pw	Zen	Vac	DR	Own	U	3	Own	Sp	17.8	4	Tr	138	3739	30x5	30x5D
White 162	——	1900	Own 6 RCB	4	4 x5¾	25.6	45@1800	Pw	Zen	Vac	DR	Own	U	4	Own	Sp	19.5	4	Tr	138	4260	30x5	30x5D
White 210	——	2300	Own 6 RCB	4	4 x5¾	25.6	45@1800	Pw	Zen	Vac	DR	Own	U	4	Own	Sp	23.4	4	Tr	148	4875	30x5	30x5D
White 211	——	2425	Own 6 RCB	4	4 x5¾	25.6	45@1800	Pw	Zen	Vac	DR	Own	U	4	Own	Sp	23.4	4	Tr	148	5110	32x6	32x6D
White 212	——	2700	Own 6 RCB	4	4 x5¾	25.6	45@1800	Pw	Zen	Vac	DR	Own	U	4	Own	Sp	23.4	4	Tr	148	5230	34x7	34x7D
White 61	——	2450	Own 4 A	6	3¾x4½	33.7	61@2100	Pw	Zen	Vac	DR	Own	U	4	Own	Sp	23.4	4	D	148	4789	30x5	30x5D
White 56	——	3125	Own GRC	4	4 x5¾	25.6	45@1600	Pw	Zen	Vac	Eis	Own	U	4	Own	Sp	26.2	R	D	165	5276	36x4S	36x7S
White 51 A	——	3750	Own GRB	4	4¼x5¾	28.9	54@1600	Pw	Zen	Vac	Eis	Own	U	4	Own	Sp	35.6	R	D	170	6438	36x5S	36x8S
White 51 AT	——	3875	Own 6 RB	4	4¼x5¾	28.9	54@1600	Pw	Zen	Vac	Eis	Own	U	4	Own	Sp	46.6	R	D	134	6227	36x5S	36x8S
White 620	——	4350	Own 3 A	6	4 x5½	38.4	72@1800	Pw	Zen	P	DR	Own	U	4	Own	Sp	41.8	4V	D	157	7300	8.25x20B	8.25x20DB
White 58	——	4400	Own GRB	4	4¼x5¾	28.9	54@1600	Pw	Zen	Vac	Eis	Own	U	4	Own	IG	49.7	D	R	180	1797	36x5S	36x5SD
White 65 K	——	4600	Own 3 A	6	4 x5½	38.4	72@1800	Pw	Zen	P	DR	Own	U	4	Own	Sp	33.9	4V	D	180	7408	8.25x20B	8.25x20DB
White 55	——	4650	Own GRB	4	4¼x5¾	28.9	54@1600	Pw	Zen	Vac	Eis	Own	U	4	Own	IG	66.1	D	R	174	8737	36x5S	40x5SD
White 621	—	4650	Own 3A	6	4 x5½	38.4	72@1800	Pw	Zen	P	DR	Own	U	4	Own	Sp	41.4	4W	R	157	7700	9.00x20B	9.00x20DB
White 52 T	——	4700	Own GRB	4	4¼x5¾	28.9	54@1600	Pw	Zen	Vac	Eis	Own	U	4	Own	IG	76.5	D	R	129	8461	36x5S	40x5SD
White 52	——	5100	Own GRB	4	4¼x5¾	28.9	54@1600	Pw	Zen	Vac	Eis	Own	U	4	Own	2R	58.4	D	R	174	9409	36x6S	40x12S
White 630	——	5050	Own 3 A	6	4 x5½	38.4	72@1800	Pw	Zen	P	DR	Own	U	4	Own	Sp	41.4	4V	D	168	8500	9.00x20B	9.00x20DB
White 631	—	5750	Own 3A	6	4 x5½	38.4	72@1800	Pw	Zen	P	DR	Own	U	4	Own	2R	56.9	4W	D	168	9000	9.00x20B	9.00x20DB
White 640	——	6100	Own 1 A B	6	4⅜x5¾	45.9	96@1800	Pw	Zen	P	L-N	Own	U	4	Own	Sp	33.9	4	D	180	9200	9.00x20B	9.00x20DB
White 641	——	6450	Own 1 AB	6	4⅜x5¾	45.9	96@1800	Pw	Zen	P	L-N	Own	U	4	Own	2R	46.9	4W	D	180	9700	9.25x20B	9.25x20DB
White 642	——	6750	Own 1 AB	6	4⅜x5¾	45.9	96@1800	Pw	Zen	P	L-N	Own	U	4	Own	2R	66.5	4W	D	180	10600	9.25x24B	9.25x24DB
White 643	——	6950	Own 1 AB	6	4⅜x5¾	45.9	96@1800	Pw	Zen	P	L-N	Own	U	4	Own	2R	66.5	4W	D	180	10900	10.50x24B	10.50x24DB
Willys Six C-113	½	395	Own C-113	6	3¼x3⅞	25.3	65@3400	Pw	Til	P	Aut	Own	U	3	Own	Sp	13.20	4	B	113	1872	5.00x19	5.00x19
Willys Six C-131	1½	595	Own C-131	6	3¼x3⅞	25.3	65@3400	Pw	Til	P	Aut	W-G	U	4	Cla	Sp	40.8	4	B	131	2625	5.50x20	6.00x32

GENERAL NOTATIONS

***†REFERENCE MARKS** apply to individual lines only and explanations are given under the subdivision for each company in the **"SPECIAL NOTATIONS."**

CAPACITIES given in this table are in tons or fractions of tons. *Shows maximum allowable gross weight in pounds.

WHEEL BASES given are standard, but optional wheel bases are available in many cases.

ENGINE—Bud, Buda; Con, Continental; Her, Hercules; Kgt, Knight; Lyc, Lycoming; Wak, Waukesha; Wis, Wisconsin; Hall, American Car & Foundry.

LUBRICATION—Pb, pressure lubrication to main and connecting rod bearings; Pw, full pressure lubrication to all main, connecting rod and camshaft bearings, including wrist pins; CS, circulating splash; Sp, splash.

CARBURETOR—Car, Carter; Mar, Marvel; Sch, Wheeler-Schebler; Str, Stromberg; DL, Detroit Lubricator; Til, Tillotson; Zen, Zenith-Detroit.

FUEL FEED—Gra, Gravity; Vac, Vacuum tank; P, Fuel pump.

IGNITION — AB, American-Bosch, Aut, Electric Auto-Lite; Eis, Eisemann; L-N, Leece-Neville; N-E, North East; RB, Robert Bosch; DR, Delco-Remy; Mag, Magneto.

TRANSMISSION—Br, L, Brown-Lipe; Cov, Covert; Ful, Fuller; Mec, Mechanics Machine; Mun, Muncie; W-G, Warner Gear; Cotta Cotta Gear Company; Cla, Clark Equipment Company.

LOCATION—C, center, amid; U, in unit with engine; J, on jackshaft.

REAR AXLE—Cla, Clark Equipment; Col, Columbia; Eat, Eaton; Sal, Salisbury; Tim, Timken; Wis, Wisconsin.

FINAL DRIVE—IG, Internal gear; St, Straight bevel; Sp, Spiral bevel; Wo, Worm; 2R, Double reduction; Ch, Chain; R, Relay drive.

BRAKES—J, Jackshaft; R, Rear wheels; D, Drive shaft; 4, four-wheel; Tr, Transmission; V, Vacuum booster; W, Westinghouse air brake; B, Both front and rear wheels.

TIRES—B, Balloon; D, Dual; S, Solid; P, Pneumatic.

SPECIAL NOTATIONS

AMERICAN-LA FRANCE

*Chief model also available as 2½-ton model, 34x7 tire, dual rear, weight 6,400. Price $3,900.

Chieftain model also available as Dump Truck, 160-inch wheel base.

Balloon tires optional on Chief, Chieftain and Big Chief models.

AUTOCAR

*Engines in these models are located under the driver's seat.

BROCKWAY

*Six wheelers.

CHEVROLET

Utility model available on 131-inch wheel base with chassis weight of 2,760 pounds and equipped with dual rear wheels.

DAY ELDER

Additional standard wheel bases are available on different models as follows:—

60	156	200	165, 180, 204
85	156, 168	240	214
110	168, 186	285	216
130	165, 180, 204	345	216
160	165, 180, 204	402	216

DODGE

*Models F40, F41, F61 and F62 can be had with double drop frame.

DIAMOND T.

*Six wheelers.

Additional standard wheel bases available as follows:—

551	158	750	167, 192
504	166½	801	180½, 199¼
506	174	1200	174½, 180
603	157, 179	1600	174½, 180
606	177½	1601	184

F. W. D.

The BTL and BT models are special line construction trucks in which complete provision for mounting AT and T earth boring machine, winch, body and other line construction accessories is included in the standard chassis.

*Indicates six-wheel model.

Special power take-off transmission, which provides 3 power take-offs which may be operated in any transmission speed, optional on all models.

*Four brake on X6 is a Bendix type, operating on all six wheels.

FEDERAL

*Six wheelers.

GRAMM

Series	Straight Rating	Wheel Base	Pay Load Range
AX 4	8,000	157	1 ton
AX 6	8,000	157	1 ton
BX 4	10,000	157	1½ ton
BX 6	10,000	157	1½ ton
CX 4	12,000	157-180	2 ton
CX 6	12,000	157-180	2 ton
B	12,000	157-174	1¾ ton
C	14,000	145-196	2 ton
D	17,000	145-196	2½ ton
E	20,000	145-196	3 ton
GW	28,000	157-240	4 ton

†Both the four and six cylinder are also offered in 157-inch wheelbase at $1,145 and $1,345, respectively.

GENERAL MOTORS TRUCK

*Capacity indicated is the Straight Rating (combined weight of chassis, body, equipment and payload) for which each chassis is designed and guaranteed to satisfactorily operate under average conditions. The size of the tires used does not affect this Straight Rating, but to secure maximum tire mileage it is suggested that the total gross weight be limited to a "recommended gross weight" for each tire equipment based on tire capacity. Prices cover base chassis and vary with wheelbase and tire combinations. The number of wheelbase lengths, tire types, range of "recommended gross weights" and resulting payload range (assuming nominal body allowance) for each model follows:—

Note: Models T-15 to T-60, inclusive, as well as Models TX and WX, are available for export only as coach chassis.

Model	Wheel Bases	Tire Types	Range of "Rec. Gross Weights"	Payload Range
T-11	1	1	3800	½
T-15	3	10	4500- 6500	½-1½
T-17	2	8	5500- 6500	1-1½
T-19	3	22	6500- 8500	1½-2
T-25	3	17	6800- 9000	1½-2
T-26	4	..	8500-11000	2-3
T-30	3	15	10000-12500	2-3
TX-186½	Exp Coach		14000	...
WX-185	Exp Coach		14500	...
T-42	4	12	12000-15000	2½-4
T-44	4	12	12000-16000	3-4½
WX-215	Exp. Coach		17000	...
T-51	4	..	16500-19000	4-5½
T-55	4	..	16500-19000	4-5½
T-60	4	18	18500-22000	5-6½
T-61	4	..	19500-22000	5-6½
T-82	4	12	19000-24000	5-7
T-85	3	..	22000-26000	5-7
T-90	3	7	22000-28000	5-7½
T-95	3	..	28000-34000	7½-10
T-96	3	..	28000-34000	7½-10

Models T-90, T-95 and T-96 are six wheelers, the latter having one driven and one trailing axle. Optional rear axle gear ratios available for all models. Double reduction axles available for Models T-60, T-61 and T-82.

INDIANA

*Six wheelers.

MACK

Other wheel bases furnished on all truck models.

On 6-wheel jobs, 4 rear wheels driven by chains, foot brake on 4 rear wheels.

HYP—Hypoid drive, single reduction.

††Made also in tractor models.

PAIGE

*Price includes panel or screen body.

PIERCE-ARROW

*Optional final drive on Models PW, PY and PZ.

REO

Model 15 Junior can be had with 4-speed transmission at additional cost. Models 15 Junior, DF 129, DF, FA, FE and FF are available with dual wheels at additional cost.

SELDEN

Additional standard wheel bases are available on different models as follows:—

Model 37C	162 and 181
39C	177 and 190½
47CB, 47CD	151, 164 and 184
67C	151, 164, 184 and 198

STEWART

Models 30 and 30X can also be supplied in 110, 120 and 140-inch wheel base.

Models 40 and 40X can also be supplied in 110, 140 and 160-inch wheel base.

*Model J4X can be supplied in 135, 145, 160 and 176-inch wheel base.

Model 28X can be supplied in 130, 145, 160 and 176-inch wheel base.

Model 29XS can be supplied in 135, 160 and 176-inch wheel base.

*Models 18X, 32X and 36X can be supplied in 148, 190 and 220-inch wheel base.

*Models 19X, 31X and 27X can be supplied in 148, 172, 190, 220 and 235-inch wheel base.

As optional equipment models 18X, 19X, 36X, 31X and 27X can be supplied with Timken dual reduction rear axle.

Model 38-8 and 38-6 can be supplied in 196, 226 and 241-inch wheel base and worm axle.

STUDEBAKER

*Capacity model GN-N is 4,000 pounds for body, cab, driver and payload.

Maximum gross load, chassis, body and payload for Models 77 and 88 is 12,500 lbs. and for Model 99 is 14,000 lbs.

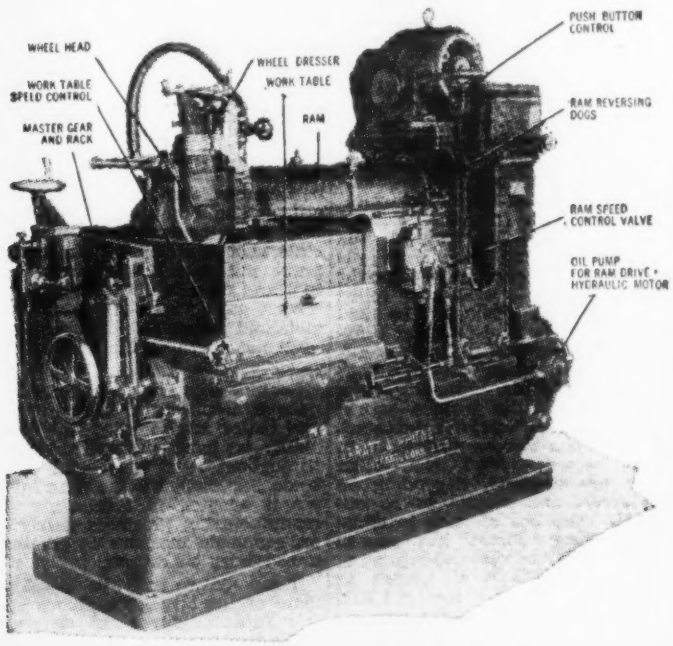
‡Hand brake same as foot brake, standard. Hand brake on drive shaft, special equipment.

Equipment - - - Development

Pratt & Whitney Develop Hydraulic Gear Grinder

Pratt & Whitney Company, Hartford, Conn., has recently introduced a nine-inch hydraulic gear grinder, which is said to be easily loaded and unloaded, making it possible for one operator to maintain production on several machines. By replacing of a few of the parts the machine is adaptable for the cutting of different types of gears.

A reciprocating horizontal ram carries the grinding wheel back and forth through the teeth, generating the adjacent sides of two teeth at once. The gears being ground are rolled past the reciprocating wheel under the guidance of a master gear and rack, so that the wheel always engages the work, tooth for tooth, as the master rack engages the master gear. The wheel makes as many passes per tooth as are necessary for the finish desired. The work is indexed automatically when it has rolled to one side, out of engagement with the grinding wheel. The machine stops automatically when all teeth are finished.



PRATT & WHITNEY nine-inch hydraulic gear grinder

Power is supplied by a five horsepower motor, which operates at 1,200 revolutions per minute. The ram and table are operated hydraulically. The grinding wheel is belt driven.

SPECIFICATIONS

Capacity—For involute spur gears: Pitch diameter, maximum, 9 in.; pitch diameter, minimum, 1 in.; diametral pitch, maximum, 3; diametral pitch, minimum, 16; pressure angle, 11° to 25°; width of face, 6 in.

Drive—Motor drive only, 5 horsepower, 1,200 revolutions per minute, either alternate current or direct current.

Wheel—Diameter, 10 in.; speeds, 2,250 and 2,810 revolutions per minute.

Floor Space (approximately) — Width, 4 ft. 3 in.; depth, 7 ft. 11 in.; height (including motor), 70 in.

Weights—Machine, regular equipment, including motor, net, approximate pounds, 5,400; crating material approximately 1,400 pounds.

Regular Equipment—The machine arranged for motor drive only, complete with five-horsepower alternate or direct current motor, as ordered, includes automatic starter and all necessary wiring; coolant tank, pump and piping; one grinding wheel, one ground master rack, one ground master gear, one ratchet and cam, wheel truing device, two holding arbors or special centers, as required, for any one gear as ordered; set of wrenches.

1931 JOBBER CLINIC IN PHILADELPHIA EXCEEDS LAST YEAR

(Continued From Page 1)

will bring their classes to the show, and big truck fleet owners plan to bring in their maintenance men in groups of forty to fifty to learn the "popular maintenance methods of today."

Features of the show include Perfect Circle talking motion picture show on the processes of manufacturing piston rings. New lubrications "check-chart" and lubrication plans receive close attention.

The jobbers group directing the show consists of the Auto Gear and Parts Company; Berrodin Auto Supply Company; Casanave Supply Company, Inc.; J. H. McCullough & Son; George W. Nock Company, Inc.; Parts Service Company; Philadelphia Motor Accessories Company; Roberts Auto and Radio Supply Company; E. P. Rotzell Company, and Supplee-Biddle Hardware Company.

The show ends March 20. Hours are 1 p. m. to midnight.

CLASSIFIED ADVERTISEMENTS IN THE AUTOMOTIVE DAILY NEWS BRING RESULTS

NORTHWEST SECTON S. A. E. HEARS TALK ON GRINDING

Seattle, Wash., March 19.—At the March meeting of the Northwest section, Society of Automotive Engineers, John A. C. Warner, secretary and general manager of the national body, was present, to meet local members and to tell about the society's work and purposes. A film was shown, for the first time, introducing President Vincent Bendix and the various vice-presidents and members of the council, via the movies.

The technical portion of the program was handled by Arthur W. Cox, factory representative for the Norton Company, Worcester, Mass., who spoke on the subject of "High Speed Grinding." A film was shown which pictured the processes of making grinding wheels of various types for all kinds of industrial use, as well as in automotive industry.

The nominating committee reported the following names, on which a final vote will be made at the next meeting: For section chairman, C. H. Bolin of Pacific Telephone and Telegraph Company; vice-chairman, James Frinck of Washington Iron Works; secretary, John Holstrum of Kenworth Truck Corporation, and for treasurer, Charles Finn, the present incumbent.

It was announced that a special meeting will be held in Vancouver, B. C., on April 4, while the next regular meeting, in Seattle, will be on the day previous.

Later it is planned to hold meetings in Spokane.

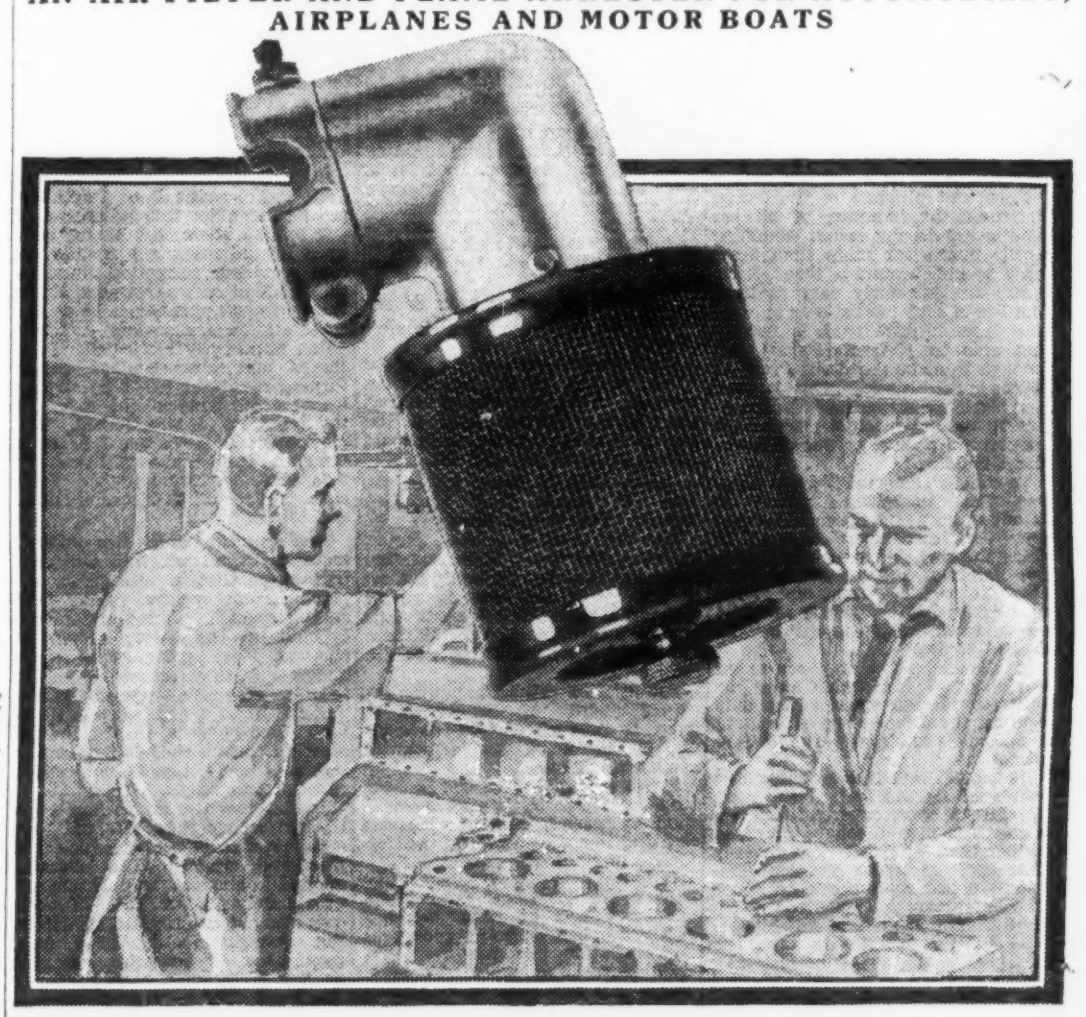
Prof. Baender of the Oregon State College will give his long-talked-of address on "Flame" at the next Seattle session.

CANADIAN LUMBER TRADE HEARS OF RETALIATION

Montreal, Que., March 19.—The local lumber trade hears that, as a measure of retaliation for the fixing of the duty on imported automobiles at 20 per cent. discount from list prices, American automobile manufacturers in Detroit, in placing a 5,000,000 feet order for hardwood have specified that it must be American, thereby cutting out Canadians from what had been a greatly appreciated market.

AIR-MAZE

AN AIR FILTER AND FLAME ARRESTER FOR AUTOMOBILES, AIRPLANES AND MOTOR BOATS



Don't Let Dirty Dollars Eat Up Your Truck Profits

It costs you real money to let road dirt, dust, grit and grime flow into your engine with every cubic inch of gas mixture.

Truck makers know it—and are using Air-Maze as standard equipment, because it is a definite safeguard against premature cylinder wear, burned bearings, sloppy pistons, early carbon and poor oil mileage.

Fleet owners are learning it mighty fast. One big fleet operator saved $101,030 in 1930 by equipping its 406 trucks with Air-Maze. It obtained 5,773,132 miles in 1930 as compared with 4,693,000 miles in 1928 at a comparative cost of .081c to .099c per mile.

Air-Maze engineers have just developed a new, heavy duty, oil bath type Air-Maze. This is designed to meet the exacting requirements of dump truck operation and all truck and tractor work where dust-laden air is encountered. It is the most ingenious and positive air filter ever made and it will not cause any power loss no matter how long it is used.

Where maintenance costs are really known, Air-Maze is sent for in a hurry. If you operate one or more trucks, be sure you have the *facts*. Don't let dirty air cost you big money this year. Know why Air-Maze cuts down repair bills at the same time that it steps up performance. Get the Air-Maze *proof* for your trucks. It's vital. Write today.

AIR-MAZE CORP. • 323 Caxton Building, Cleveland, Ohio

Fundamentals of Steering Alignment

By A. R. PLATT
Carnegie Institute of Technology, Pittsburgh, Pa.

The following is a paper presented recently before the Pittsburgh section, Society of Automotive Engineers:

IN discussing a subject of this nature, it is necessary to have an understanding of what constitutes a good or a bad steering gear, what features are desirable and what features are undesirable, in order that we may have something definite to accomplish in altering adjustment or design.

The two broad subjects directly related to steering design are service and steering quality and tire wear. These two are so closely related that many times corrections of one alter the other for better or for worse.

It is common to refer to the steering gear as a single unit, when really the subject should be divided into two parts—the axle assembly and the gear proper. A poor gear cannot influence tire wear, but many times a perfectly good gear is spoiled by a poor axle layout.

Desirable features of a steering gear are as follows:

It should handle easily. A gear which handles easily is the source of constant pleasure to the owner, improves the handling of his car and makes driving easier. Handling easily means far more than being easy to pull around a turn. Some gears are extremely easy to turn, but are of such low ratio as to cause the driver inconvenience by not being able to turn the wheel fast enough to make the desired turn at a convenient speed. This is most noticeable when parking or maneuvering the car in close places, such as turning a short corner or entering a building.

It should right itself after turning. This contributes much to handling ease and lessens considerably the total effort required to drive the car. Too much of this is not desirable, as it necessitates more effort to turn a corner, and rights so quickly that the driver must be on guard to keep the car on the desired course.

It should hold a true course on the road. A car which must be jockeyed all the time is not only causing the driver extra effort, but is a menace to other traffic in tight places.

It should have that property best expressed as the feel of the road, for after all, an experienced driver senses the road through the wheel rather than by sight. Too much of this borders on the common complaint called road shock, in which the bumps are too apparent at the wheel. The degree of reversibility has considerable to do with this feature, assuming a correct axle setup, and can be expressed roughly by saying that road shock varies inversely with the degree of irreversibility of the gear, other things being equal

It should be geometrically good to avoid excessive tire wear. Tire wear has nothing to do with the type of gear used, but is the result of the geometry of the axle assembly.

As before noted, a good gear may not produce good handling, due to a poor axle assembly, while a good axle assembly may be ruined from the handling standpoint by the wrong gear. The good axle with a poor gear may produce wonderful tire mileage, but be very hard to handle, while many a car which feels good to the driver punishes the tires severely, many times wearing them out in a fraction of their normal life. Certain axle defects, however, are apparent in handling the car, and these are usually the ones which receive the most prompt attention. Unfortunately, many defects in steering quality come on so gradually that the owner is not conscious of the defects. This applies most directly to the errors affecting tire wear. These defects are usually found when the owner suddenly realizes that his tires are not delivering the mileage he expected. His logical move is to call on his tire merchant, who, if progressive enough, checks, or has the axle checked, at which time the errors are found. The owner fails to realize that thousands of miles of hammering over the road, rounding curves at high speed, falling into chuck holes, etc., have all had their effect. Truly, it is remarkable what the steering gear of the modern car will stand.

Steering quality also embraces several other points which may not be apparent to the driver. Defective turning radius makes it necessary for one front wheel to skid part way on a turn, which induces front-end skidding on curves. Correction makes for better roadability as well as reduced tire wear.

From the preceding paragraphs it becomes evident then that there are two primary reasons for steering service. These are steering quality and tire wear.

Before enumerating the factors affecting the above, it may be stated generally that correction of faults affecting tire wear usually improve steering quality, while corrections for steering quality may or may not affect tire wear, although if properly done they should improve tire wear.

Following is a definition of the four major items affecting the axle set-up:

Camber—The vertical pitch of the front wheels, when viewed from head on. This should be so set that the wheels are farther apart at the top than at the bottom, and should always be equal on each side.

Caster—The backward tilt of the axle. It should lean backward slightly when viewed from the side.

Turning Radius — The proper spread of the wheels when rounding a corner. Whether generally known or not, the wheels actually spread away from each other in front when making a turn, so as to permit them to follow the arcs of circles having a common center.

Toe-in—The gather, or pulling together slightly of the wheels in front, to produce friction-free rolling by balancing the effects of camber and caster.

Following is a list of the steering troubles most frequently encountered in service, their usual causes and the remedies usually found effective in eliminating them:

Shimmy (low speed)—The major causes are loose or worn parts, wabbly wheels or rims, incorrect caster, camber, or both; poor tires, underinflation, bent parts.

Shimmy (high speed)—Same as above, plus poor front springs, shock absorbers, loose motor bolts, unbalanced wheels or drive shafts.

Pull to right or left—Tire pressure, incorrect camber, caster, or both.

Weave or wander—Loose or worn parts, incorrect caster, uneven camber, uneven caster, tire pressure or condition, toe-out.

Road shock—Springs, position of drag link, tires, loose or worn parts, incorrect camber, caster, or both.

Tramp—Loose or worn parts, tires, weak front springs, poor shock absorbers, or both, or vibrations from other parts of car.

Hard steering — Adjustments too tight, lack of lubrication, soft tires, incorrect tire sizes, improper steering ratio, caster.

Does not recover after turning—Tight adjustment, lack of lubrication, incorrect caster, camber, or both.

Tire Wear—Incorrect caster, camber, turning radius or toe-in, loose or worn parts, wobbly rims, underinflation, bent parts, faulty brakes.

It will be noted that all the faults listed above, except the last, deal with steering quality, although the last, tire wear, just about equals in service volume all the others together.

There are just two reasons for all the above-listed errors, with all the attendant service required, errors in manufacture and normal wear and abuse.

Some research work done by a subcommittee of this society (results not yet ready for publication) showed that, of 100 new cars tested, less than 50 per cent. met the manufacturers' specifications at time of delivery.

After altering the adjustments of these cars to meet the manufacturers' specifications, and putting them on the road, a large percentage did not maintain the settings after 1,000 miles of driving.

A new car having errors in the axle set-up may adjust itself nearer to or further from the maker's specifications, depending upon what the error is at the time service begins. This gradual adjustment is due to wearing in of the parts, sagging of the springs, etc., which will take place with any new piece of machinery unless properly worn in and readjusted before delivery, which is, of course, out of the question with modern production methods.

After the 1,000-mile period, those cars which had structurally strong axle assemblies, having been readjusted, maintained their settings within fairly close limits for several thousand miles of service.

The parts most affected by this first period are the ball joints, front springs, rims, etc. Camber should not change, although instances have been noted in which this occurred.

Any new car, after the breaking-in period, should be checked and set to manufacturers' specifications, or the settings altered to suit local conditions. Many times the factory set-up is not the best that can be had for certain driving conditions. The wide differences now existing in front-end specification furnish proof enough for this statement.

It follows, then, that having been worn in and reset, any further errors requiring correction must be the result of normal wear or abuse. Wear of parts should not be a vital consideration for several thousand miles, if properly lubricated. Road shocks may alter camber, caster, turning radius, or toe-in by slightly bending the ends of the axle, the steering arms or the tie rod. This may occur at either end or both. Grabbing front brakes will twist the axle ends, destroying proper caster, and, as a result, the turning radius and toe-in.

One operation which has not been mentioned, and which is very important, is that of altering or replacing front springs. Every time a front spring is altered or replaced or built up, the caster should be checked. The spring alteration is almost sure to affect caster, and in so doing also affects turning radius and toe-in to a greater or less extent. The point is, that if the assembly is not checked, it may be correct or it may not, and if not, serious consequences result.

In the past two and a half years the writer has checked about 5,000 cars, practically all of which had front-end trouble. The checking applied to tire wear mainly, but approximately 75 per cent. of these cars also had errors seriously affecting steering quality. The commonest error affecting steering quality is shimmy, both high and low speed. This will send an owner to the shop more quickly than any other fault. An owner will tolerate a stiff steering, or a wander, and get accustomed to it, but when a car commences to shimmy, the owner usually hunts a shop. The unfortunate part of the shop work is that the owner too often falls into the hands of an incompetent or improperly equipped shop. Here the mechanics grope around, trying this and that, and finally give up in disgust. This often creates in the mind of the car owner the erroneous impression that the trouble cannot be rectified, or at least makes him very skeptical of anything which may be told him in the future.

In making corrections of any of the errors mentioned, three things are requisite:

A knowledge of the fundamental principles involved.

Proper equipment.

Ability to handle the equipment and make it serve the purpose for which it was intended.

Much is being done at present in the way of improvement of equipment, and it goes without saying that, in view of the widespread prevalence of front-end troube, such knowledge as is now available is being disseminated as widely as possible.

NEW FRANKLIN DEALER

Westfield, N. Y., March 19.—The Grape Belt Motors, with sales and service station on the main highway through this town, has been appointed dealer for Franklin automobiles.

Annealing Furnaces

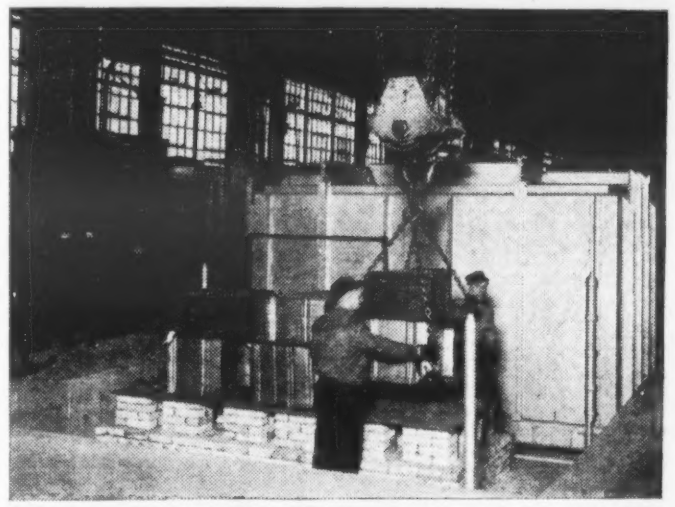


FIG. 6. Large rectangular bell-type furnace used for annealing punchings of high silicon steel. This type is in operation up to 60,000 pounds charge

(Continued from Page 14)

and utilitarian sttandpoint, for the majority of bright annealing applications. Of course, the particular results to be obtained, the cycle employed, the metal heated and local economies enter into the selection of such a gas. For instance, the blast-furnace and coke oven gas mentioned in connection with bright anneal of low carbon cold rolled steel would not ordinarily be used on high carbon tool or roller bearing stock, but rather cracked butane, which, when properly controlled, can either add, subtract or hold constant the surface carbon content so important with such steel. For the non-ferrous metals, i. e., brass, copper, nickel, etc., other gases are required, depending on the metal and results to be obtained. The use of such artificial furnace atmospheres has necessi tated rather complete redesigning of furnace shells and structures, as these gases are quite light and thin at high temperatures. As most of these gases are explosive, the technique of safely handling the equipment when hot has had to be developed.

As annealing in artificial atmospheres is in its early development stages still, possibilities along this line are not known. However, certain surface conditions can be obtained that reduce the number of subsequent operations and greatly increase die life and reduce machine work. Recent investigations seem to indicate that at least on some metals and alloys the grain, size and structure are affected by the atmosphere during heat treatment. If these findings prove to be correct, a great deal of developmnt on artificial atmospheres for this purpose alone may be expected.

In addition to securing clean annealed surfaces otherwise unattainable, these artificial atmospheres are showing a possibility of reduced cost of product by reducing or eliminating the usual pickling, washing and drying operations.

Recent extensive tests on high grade tin plate stock in production lots demonstrates at least the possibility of going directly from the annealing furnace to the tin bath. Present results along this line are quite encouraging, but further research work will undoubtedly be necessary to perfect such a process. The possibilities along this line, in the whole industry, are very extensive.

Bright annealing of the high chromium series, such as 18 and 8, is also attracting considerable attention, due to the rapidly increasing demand for this new metal. This steel cannot be annealed as simply, even in artificial atmospheres, as the carbon steel, due to the fact that the rate of cooling, must be rapid the rate of cooling must be rapid and under constant control. The annealing temperatures are also rather high, being 1,900 to 2,000 degrees Fahrenheit. For these steels, artificial cooling is necessary.

Future Trends—It is always difficult and hazardous to attempt to predict what the future will bring in a rapidly expanding industry, so only a few of the present tendencies and possible developments will be enumerated for what they may be worth:

First—A rather rapid and extensive expansion of electric annealing, bright and semi-bright to the wire, strip and sheet mills generally. It is believed that this will be necessary from an economic and competitive cost standpoint, if from no other. These economies result from lower maintenance, lower operating costs, shorter cycles, better products, fewer subsequent operations, long tool and die life, fewer rejects and reruns, etc. These are actual tangible and measurable quantities and need not be the subject of opinion or speculation.

Second—The use of artificial furnace atmospheres to secure special and better results will in all probability be more generally adopted throughout the steel and metal trade. Especially will the near future see it adopted in fabricating and manufacturing processes purely as an economic measure to eliminate unnecessary operations.

Third—There will be developed more of the large, continuous electric furnaces for sheet annealing and normalizing, and with artificial atmospheres. A great deal of engineering, though, has already been put on this subject, but as yet a design generally suitable has not been evolved. One or two applications have been made of overhead conveyor furnaces, such as those now used for vitreous enameling, but these are only partially successful where bright anneal is considered. Successful small electric annealing furnaces for small parts are numerous now, but these designs cannot be extended to the sizes required for large tonnages of sheet and strip.

Fourth—There will be a rather extensive development and application of the principle of inductive heating to numerous heat treating processes now considered unsuitable. Among these, will be annealing and normalizing of sheet and strip, perhaps continuously and rapidly, such as between passes in the mill. Annealing of structural shapes and especially tubing by this means is certain to come. Some work along this line has already been accomplished, with more to follow shortly. This work is still in its experimental stage and is not yet ready for the market. A few years more may see this principle so developed as to be attractive for both high and low temperatures.

It is unlikely that there will be much of a revival of the direct heating processes such as the "Snead process" of passing current directly through wire, strip tubing, etc. While this method possesses attractive features, its application is fraught with control and practical difficulties of such character as to preclude its very general adoption as far as we can now determine. The future may, of course, eliminate some of these shortcomings and further develop the advantages.

FOLEY JOINS KELLY TIRE

Pittsburgh, Pa., March 19.—F. X. Foley, for the past twenty years identified with the tire industry, has been appointed Pittsburgh branch manager of the Kelly Springfield Rubber Company. He was formerly identifed with the bus and truck tire division of the company with headquarters in Philadelphia.